	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments	Error Definition	Errors
1	BRS	L1	1	JP-11336502-$.did.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/02 10:21			
2	BRS	L2	5242	(428/668 or 428/679 or 428/926 or 420/435 or 420/436 or 420/437 or 420/438 or 420/439 or 420/440 or 420/580 or 420/588 or 148/408 or 148/425 or 148/442).ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/02 10:24			
3	BRS	L3	431	2 and cobalt and (chromium or cr) and (tungsten or w or tu) and (silicon or si) and (carbon or c) and (nickel or ni) and (molybdenum or mo) and (iron or fe) and (manganese or mn)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/02 10:27			

	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments	Error Definition	Errors
4	BRS	L5	3	4 not (aluminum or aluminium or al)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/02 10:30			
5	BRS	L4	70	3 and (coating or coatings) and (turbine or turbines)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/02 11:05			
6	BRS	L6	2	EP-759500-$.did.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/02 11:07			

	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments	Error Definition	Errors
7	IS&R	L7	4	(("5084113") or ("4269868")).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/02 11:12			

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
1			US 20040170521 A1	20040902	5	Protective coating	420/443	420/437; 420/438; 420/446; 428/668; 428/680
2			US 20040161628 A1	20040819	8	Article including a substrate with a metallic coating and a chromium-aluminide protective coating thereon, and its preparation and use in component restoration	428/633	416/241R; 428/668; 428/680
3			US 20040106000 A1	20040603	6	Cobalt-based alloy for the coating of organs subject to erosion by liquid	428/668	420/436; 427/595
4			US 20040091639 A1	20040513	7	Method for treating organs subject to erosion by liquids and anti-erosion coating alloy	427/595	420/440
5			US 20040005477 A1	20040108	7	Product having a layer which protects against corrosion, and process for producing a layer which protects against corrosion	428/678	416/241R; 420/40; 420/437; 420/445; 420/455; 428/633; 428/680
6			US 6846575 B2	20050125	11	Article having turbulation and method of providing turbulation on an article	428/606	228/56.3; 420/40; 420/437; 420/443; 420/445; 428/546
7			US 6793878 B2	20040921	5	Cobalt-based hard facing alloy	420/436	

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
8			US 6746782 B2	20040608	9	Diffusion barrier coatings, and related articles and processes	428/632	204/192.15; 420/37; 420/428; 420/430; 420/432; 420/433; 420/437; 420/448; 420/588; 420/82; 427/250; 427/405; 427/455; 427/531; 427/596; 428/336; 428/655; 428/656; 428/675; 428/678; 428/680

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
9			US 6610416 B2	20030826	15	Material treatment for reduced cutting energy and improved temperature capability of honeycomb seals	428/593	148/516; 148/527; 148/537; 415/173.4; 415/173.5; 415/174.4; 415/174.5; 427/248.1; 427/252; 427/585; 427/592; 427/593; 428/116; 428/118; 428/594; 428/637; 428/650; 428/652; 428/653; 428/678; 428/689; 428/698; 428/73; 428/908.8; 428/925; 428/926; 428/938; 428/941
10			US 6365285 B1	20020402	11	Cobalt-base composition and method for diffusion braze repair of superalloy articles	428/668	420/435; 420/437; 420/438; 428/652; 428/670

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
11			US 6355356 B1	20020312	11	Coating system for providing environmental protection to a metal substrate, and related processes	428/472	416/241R; 427/383.7; 427/452; 427/455; 427/456; 428/610; 428/615; 428/621; 428/632; 428/668; 428/678; 428/679; 428/680; 428/937
12			US 6258317 B1	20010710	10	Advanced ultra-supercritical boiler tubing alloy	420/448	148/410; 148/442; 420/588
13			US 6221181 B1	20010424	9	Coating composition for high temperature protection	148/428	148/410; 148/442; 420/445; 428/680
14			US 6195864 B1	20010306	10	Cobalt-base composition and method for diffusion braze repair of superalloy articles	29/402.01	148/425; 228/262.31; 29/402.18; 420/438
15			US 6060174 A	20000509	5	Bond coats for turbine components and method of applying the same	428/610	416/241R; 420/437; 420/440; 420/443; 420/445; 428/621; 428/633; 428/678
16			US 5916518 A	19990629	12	Cobalt-base composition	420/438	148/408; 148/425; 228/262.31; 420/435; 420/436; 420/437; 420/439

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
17			US 5599385 A	19970204	7	High temperature-resistant corrosion protection coating for a component, in particular a gas turbine component	106/14.05	420/437; 420/438; 420/445; 420/446; 420/447; 420/448; 420/449; 420/450; 428/457
18			US 5582635 A	19961210	6	High temperature-resistant corrosion protection coating for a component in particular a gas turbine component	106/14.05	420/437; 420/438; 420/445; 420/446; 420/447; 420/448; 420/449; 420/450; 427/248.1; 427/383.1; 427/383.3; 427/383.7; 427/455; 427/456; 427/576; 428/457
19			US 5480283 A	19960102	24	Gas turbine and gas turbine nozzle	415/199.5	148/425; 148/428; 415/200; 420/436; 420/448
20			US 5455119 A	19951003	16	Coating composition having good corrosion and oxidation resistance	428/632	420/437; 420/443; 420/444; 420/588; 428/639; 428/640

21			US 5401307 A	19950328	6	High temperature-resistant corrosion protection coating on a component, in particular a gas turbine component	106/14.05	106/1.21; 106/1.27; 106/1.28; 420/435; 420/441; 428/457

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
22			US 5370497 A	19941206	22	Gas turbine and gas turbine nozzle	415/199.5	148/410; 148/419; 148/425; 148/428; 415/200; 420/436; 420/448; 60/909
23			US 5366565 A	19941122	13	NbTiAlCrHf alloy and structures	148/426	148/422; 420/580
24			US 5192625 A	19930309	8	Cobalt-base wrought alloy compositions and articles	428/668	148/442; 420/588; 428/678
25			US 5077006 A	19911231	15	Heat resistant alloys	420/584.1	420/40; 420/430; 420/431; 420/443; 420/451; 420/453; 420/454; 420/53; 420/580; 420/581; 420/583; 420/586
26			US 4814236 A	19890321	7	Hardsurfaced power-generating turbine components and method of hardsurfacing metal substrates using a buttering layer	428/678	228/119; 228/208; 29/889; 29/889.1; 428/679; 428/939
27			US 4764225 A	19880816	5	Alloys for high temperature applications	148/404	148/410; 148/419; 148/428; 148/442
28			US 4704338 A	19871103	6	Steel bonded dense silicon nitride compositions and method for their fabrication	428/627	428/679; 428/680

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
29			US 4692305 A	19870908	5	Corrosion and wear resistant alloy	420/436	148/403; 420/439; 420/442; 420/443; 420/451; 420/453; 420/454; 420/587; 420/588
30			US 4615864 A	19861007	10	Superalloy coating composition with oxidation and/or sulfidation resistance	420/437	148/425; 148/428; 420/438; 420/443; 420/444; 420/445
31			US 4480016 A	19841030	4	Homogeneous, ductile brazing foils	428/678	148/403; 428/606; 428/679; 428/680; 428/685
32		X	US 4415532 A	19831115	6	Cobalt superalloy	420/585	148/442; 420/582; 420/586
33			US 4380574 A	19830419	8	High-damping composite material	428/686	205/149; 205/239; 205/255; 427/405; 428/679
34			US 4339509 A	19820713	9	Superalloy coating composition with oxidation and/or sulfidation resistance	428/632	428/637; 428/639; 428/668; 428/678; 428/680; 428/926; 428/937
35			US 4297135 A	19811027	7	High strength iron, nickel and cobalt base crystalline alloys with ultrafine dispersion of borides and carbides	148/321	148/324; 148/330; 148/423; 148/425; 148/426; 148/442; 75/238; 75/241; 75/246; 75/255

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
36			US 4241147 A	19801223	5	Diffusion aluminized age-hardenable stainless steel	428/652	427/405; 428/651; 428/679; 428/926
37			US 4237193 A	19801202	7	Oxidation corrosion resistant superalloys and coatings	428/678	148/404; 148/428; 428/652; 428/653; 428/679
38			US 4183774 A	19800115	9	High-endurance superalloy for use in particular in the nuclear industry	420/47	148/442; 420/53; 420/585; 420/586.1
39			US 4153453 A	19790508	6	Composite electrodeposits and alloys	420/94	205/109; 205/228; 205/67; 205/69; 205/70; 420/435; 420/436; 420/441; 420/442; 420/459
40			US 4124737 A	19781107	6	High temperature wear resistant coating composition	428/640	148/425; 148/442; 420/436; 420/588; 428/668; 428/679; 428/926; 428/937; 75/235; 75/338
41			US 4101715 A	19780718	4	High integrity CoCrAl(Y) coated nickel-base superalloys	428/652	420/437; 420/448; 427/405; 427/456; 428/668; 428/680

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
42			US 4101713 A	19780718	9	Flame spray oxidation and corrosion resistant superalloys	428/554	427/405; 427/456; 428/553; 428/564; 428/652; 428/656; 428/667; 428/668; 428/678; 428/937
43			US 4081710 A	19780328	7	Platinum-coated igniters	313/141	123/169EL ; 420/435; 420/456
44			US 4080486 A	19780321	7	Coating system for superalloys	428/653	428/652; 428/678; 428/926
45			US 3998603 A	19761221	9	Protective coatings for superalloys	428/651	427/250; 428/652; 428/667; 428/680; 428/686; 428/926; 428/938
46			US 3955935 A	19760511	9	Ductile corrosion resistant chromium-aluminum coating on superalloy substrate and method of forming	428/553	204/490; 428/652; 428/686; 428/926; 428/939
47			US 3898052 A	19750805	9	Corrosion resistant coating system for ferrous metal articles having brazed joints	428/632	428/668; 428/672; 428/673; 428/674; 428/684; 428/941
48			US 3864093 A	19750204	4	High-temperature, wear-resistant coating	428/564	428/472; 428/640; 428/641; 428/651; 428/652; 428/653; 428/926; 75/252

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
49			US 3837894 A	19740924	9	PROCESS FOR PRODUCING A CORROSION RESISTANT DUPLEX COATING	427/419.2	427/419.7 ; 427/454; 428/432; 428/621; 428/627; 428/632; 428/679; 428/926; 428/940
50			US 3819338 A	19740625	4	PROTECTIVE DIFFUSION LAYER ON NICKEL AND/OR COBALT-BASED ALLOYS	428/652	428/670; 428/678; 428/926; 428/938; 428/941
51			US 3801353 A	19740402	10	METHOD FOR COATING HEAT RESISTANT ALLOYS	427/252	415/200; 416/241R; 428/650; 428/668
52			US 3795430 A	19740305	7	WEAR RESISTANT FRICTIONALLY CONTACTING SURFACES	384/625	420/436; 420/441
53			US 3785785 A	19740115	3	SOLID SURFACE LUBRICANT COATING	428/553	428/673; 428/926; 428/934; 508/103
54			US 3649226 A	19720314	7	OXIDATION-SULFIDATION RESISTANT ARTICLES	428/652	428/655; 428/926; 428/941
55			US 3764371 A	19731009	6	FORMATION OF DIFFUSION COATINGS ON NICKEL CONTAINING DISPERSED THORIA	427/253	148/240; 428/668; 428/680
56			US 3677789 A	19720718	3	PROTECTIVE DIFFUSION LAYER ON NICKEL AND/OR COBALT-BASED ALLOYS	148/527	205/191; 205/194; 205/228; 427/205; 427/250; 427/376.8 ; 428/668; 428/670; 428/680

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
57			US 3597172 A	19710803	2	ALLOYS HAVING AN ALUMINUM-DIFFUSED SURFACE LAYER	428/652	205/191; 205/228; 428/678; 428/679; 428/926
58			US 3577233 A	19710504	3	HIGH TEMPERATURE BRAZING ALLOYS	420/508	420/588
59			US 3477831 A	19691111	10	COATED NICKEL-BASE AND COBALT-BASE ALLOYS HAVING OXIDATION AND EROSION RESISTANCE AT HIGH TEMPERATURES	428/629	427/252; 427/253; 427/405; 428/469; 428/650; 428/662; 428/678; 428/926; 428/938
60			US 3423218 A	19690121	5	BORON PHOSPHIDE COMPOSITIONS	420/87	148/400; 148/401; 148/420; 148/421; 148/422; 148/423; 148/424; 148/426; 148/432; 148/437; 148/441; 420/121; 420/402; 420/417; 420/422; 420/424; 420/427; 420/428; 420/431; 420/434; 420/441; 420/499; 420/513; 420/557; 420/563; 420/576; 420/580; 423/299; 501/94

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
61			US 3241954 A	19660322	4	Cobalt-base alloy	420/436	420/440; 420/583; 420/585; 420/588
62			US 3218135 A	19651116	12	Powder metal compositions containing dispersed refractory oxide	428/565	313/340; 313/346R; 419/10; 419/19; 419/20; 428/570; 428/667; 428/679; 75/255
63			US 3143383 A	19640804	5	Means for preventing fretting erosion	428/656	29/898.14; 403/179; 420/440; 420/446; 420/485; 420/53; 420/587; 428/671; 428/678
64			US 3129069 A	19640414	9	Oxidation-resistant turbine blades	428/652	416/241R; 428/678; 428/926; 428/936; 428/937; 428/939; 428/941
65			US 3118763 A	19640121	6	Cobalt base alloys	420/439	420/583; 420/588
66			US 3077285 A	19630212	20	Tin-nickel-phosphorus alloy coatings	220/62.17	384/276; 384/912; 428/34.1; 428/457; 428/648; 428/679; 428/926; 428/938

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
67			US 3008855 A	19611114	4	Turbine blade and method of making same	416/241R	164/122.2 ; 164/256; 164/61; 416/224; 416/97A; 420/436; 420/449; 428/39; 428/611; 428/636; 428/637; 75/10.18; 75/10.65; 75/230; 75/628
68			US 2988807 A	19610620	5	Method of aluminizing cobalt base alloys and article resulting therefrom	428/652	148/535; 427/292; 427/295; 427/328; 427/427; 427/456; 428/675; 428/926; 428/937; 428/941
69			US 2714245 A	19550802	10	Sintered titanium carbide alloy turbine blade	416/241B	29/889.71 ; 416/241R; 428/545; 428/600; 428/926
70			US 2513303 A	19500704	3	Coated cobalt alloy products	428/472.1	148/264; 420/436

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                 February 2005
 NEWS 17  FEB 25 CA/CAPLUS - Russian Agency for Patents and Trademarks
                 (ROSPATENT) added to list of core patent offices covered
 NEWS 18  FEB 10 STN Patent Forums to be held in March 2005
 NEWS 19  FEB 16 STN User Update to be held in conjunction with the 229th ACS
                 National Meeting on March 13, 2005
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=> s (co 45-65)/mac
        116934 CO/MAC
        192215 45-65/MAC
L1       15171 (CO 45-65)/MAC
                 (CO/MAC (P) 45-65/MAC)

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         89441 28-32/MAC
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L2        1848 L1 AND (CR 28-32)/MAC

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        149292 6-8/MAC
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L3         342 L2 AND (W 6-8)/MAC

=> s l2 and (tu 6-8)/mac
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                 (TU/MAC (P) 6-8/MAC)
L4           0 L2 AND (TU 6-8)/MAC

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        578613 0-2/MAC
        272365 (SI 0-2)/MAC
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=> s l5 and (c 1-2)/mac
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         384833 1-2/MAC
          30182 (C 1-2)/MAC
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L6          105 L5 AND (C 1-2)/MAC

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         310689 3-6/MAC
          35358 (NI 3-6)/MAC
                (NI/MAC (P) 3-6/MAC)
L7           50 L6 AND (NI 3-6)/MAC

=> s l7 and (mo 1-3)/mac
         174453 MO/MAC
         465425 1-3/MAC
          56992 (MO 1-3)/MAC
                (MO/MAC (P) 1-3/MAC)
L8           33 L7 AND (MO 1-3)/MAC

=> s l8 and (fe 0-1)/mac
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         519264 0-1/MAC
          47783 (FE 0-1)/MAC
                (FE/MAC (P) 0-1/MAC)
L9           24 L8 AND (FE 0-1)/MAC

=> s l9 and (mn 0-1)/mac
         329755 MN/MAC
         519264 0-1/MAC
         210560 (MN 0-1)/MAC
                (MN/MAC (P) 0-1/MAC)
L10          17 L9 AND (MN 0-1)/MAC

=> d l10 all

L10  ANSWER 1 OF 17  REGISTRY  COPYRIGHT 2005 ACS on STN
RN   676123-37-8  REGISTRY
ED   Entered STN:  19 Apr 2004
CN   Cobalt alloy, base, Co 45-61,Cr 28-32,W 6-8,Ni 3-6,Mo 1-3,Si 0.1-2,C
     1.2-1.7,Fe 0-1,Mn 0-1 (9CI)  (CA INDEX NAME)
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
SR   CA
LC   STN Files:   CA, CAPLUS, USPATFULL
DT.CA  CAplus document type:  Patent
RL.P   Roles from patents:  USES (Uses)

Component   Component      Component
             Percent    Registry Number
========+============+==============
   Co      45   -  61       7440-48-4
   Cr      28   -  32       7440-47-3
   W        6   -   8       7440-33-7
   Ni       3   -   6       7440-02-0
   Mo       1   -   3       7439-98-7
   Si       0.1 -   2       7440-21-3
   C        1.2 -   1.7     7440-44-0
   Fe       0   -   1       7439-89-6
   Mn       0   -   1       7439-96-5
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               1 REFERENCES IN FILE CA (1907 TO DATE)
               1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE  1

AN     140:290742  CA
TI     Cobalt alloy for coating of components subject to erosion by liquids
IN     Giannozzi, Massimo
PA     Nuovo Pignone Holding S.P.A., Italy
SO     Eur. Pat. Appl., 12 pp.
       CODEN: EPXXDW
DT     Patent
LA     English
IC     ICM  C23C024-10
       ICS  C22C019-07; B23K035-30
CC     56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1
       PATENT NO.        KIND  DATE          APPLICATION NO.  DATE
       ---------------   ----  --------      ---------------  --------
PI     EP 1403397         A1   20040331      EP 2003-256034   20030925
           R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
               IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK
       US 2004106000      A1   20040603      US 2003-670121   20030925
       JP 2004169176      A2   20040617      JP 2003-333738   20030925
PRAI IT 2002-MI2056     20020927
AB     The cobalt alloy comprises Cr 28-32, W 6-8, Si 0.1-2, C 1.2-1.7, Ni 3-6,
       and Mo 1-3% and may also comprise Fe and Mn ≤1% each.  The typical
       Co alloys contains Cr 30, W 7, Si 1, C 1.5, Ni 4.5, Fe <0.3, Mn <0.3, and
       Mo 1.8.  The alloy is especially suitable for laser cladding to provide
       protective coatings for the vapor turbine blades.
ST     cobalt alloy laser cladding coating turbine blade
IT     Turbines
          (blades; cobalt alloy for coating of turbine blades)
IT     Coating materials
       Laser cladding
          (cobalt alloy for coating of turbine blades)
IT     Corrosion
       Erosion (wear)
          (erosion-corrosion; cobalt alloy for coating of turbine blades)
IT     676123-33-4   676123-34-5   676123-35-6   676123-36-7   676123-37-8
       RL: TEM (Technical or engineered material use); USES (Uses)
          (cobalt alloy for coating of turbine blades)
RE.CNT  5      THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Crook, P; US 4415532 A 1983 CAPLUS
(2) Fuji, V; EP 0759500 A 1997 CAPLUS
(3) Giorni, E; Proc Conf EUROMAT 99 1999, V11, P76
(4) Livsey, N; US 4269868 A 1981 CAPLUS
(5) Mori, K; US 5084113 A 1992 CAPLUS


=> d l10 1-17 all

L10    ANSWER 1 OF 17  REGISTRY  COPYRIGHT 2005 ACS on STN
RN     676123-37-8  REGISTRY
ED     Entered STN:  19 Apr 2004
CN     Cobalt alloy, base, Co 45-61,Cr 28-32,W 6-8,Ni 3-6,Mo 1-3,Si 0.1-2,C
       1.2-1.7,Fe 0-1,Mn 0-1 (9CI)  (CA INDEX NAME)
MF     C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI     AYS
SR     CA
LC     STN Files:   CA, CAPLUS, USPATFULL
DT.CA  CAplus document type:  Patent
RL.P   Roles from patents:  USES (Uses)
```

Component	Component Percent	Component Registry Number
Co	45 - 61	7440-48-4
Cr	28 - 32	7440-47-3
W	6 - 8	7440-33-7
Ni	3 - 6	7440-02-0
Mo	1 - 3	7439-98-7
Si	0.1 - 2	7440-21-3
C	1.2 - 1.7	7440-44-0
Fe	0 - 1	7439-89-6
Mn	0 - 1	7439-96-5

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 140:290742 CA
TI Cobalt alloy for coating of components subject to erosion by liquids
IN Giannozzi, Massimo
PA Nuovo Pignone Holding S.P.A., Italy
SO Eur. Pat. Appl., 12 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM C23C024-10
ICS C22C019-07; B23K035-30
CC 56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1403397	A1	20040331	EP 2003-256034	20030925
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	US 2004106000	A1	20040603	US 2003-670121	20030925
	JP 2004169176	A2	20040617	JP 2003-333738	20030925

PRAI IT 2002-MI2056 20020927
AB The cobalt alloy comprises Cr 28-32, W 6-8, Si 0.1-2, C 1.2-1.7, Ni 3-6, and Mo 1-3% and may also comprise Fe and Mn ≤1% each. The typical Co alloys contains Cr 30, W 7, Si 1, C 1.5, Ni 4.5, Fe <0.3, Mn <0.3, and Mo 1.8. The alloy is especially suitable for laser cladding to provide protective coatings for the vapor turbine blades.
ST cobalt alloy laser cladding coating turbine blade
IT Turbines
(blades; cobalt alloy for coating of turbine blades)
IT Coating materials
Laser cladding
(cobalt alloy for coating of turbine blades)
IT Corrosion
Erosion (wear)
(erosion-corrosion; cobalt alloy for coating of turbine blades)
IT 676123-33-4 676123-34-5 676123-35-6 676123-36-7 676123-37-8
RL: TEM (Technical or engineered material use); USES (Uses)
(cobalt alloy for coating of turbine blades)
RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Crook, P; US 4415532 A 1983 CAPLUS
(2) Fuji, V; EP 0759500 A 1997 CAPLUS
(3) Giorni, E; Proc Conf EUROMAT 99 1999, V11, P76
(4) Livsey, N; US 4269868 A 1981 CAPLUS
(5) Mori, K; US 5084113 A 1992 CAPLUS

L10 ANSWER 2 OF 17 REGISTRY

RN 676123-36-7 REGISTRY
ED Entered STN: 19 Apr 2004
CN Cobalt alloy, base, Co 53,Cr 30,W 7,Ni 4.5,Mo 2,C 1.5,Si 1,Fe 0.5,Mn 0.3 (9CI) (CA INDEX NAME)
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS, USPATFULL
DT.CA CAplus document type: Patent
RL.P Roles from patents: USES (Uses)

Component	Component Percent	Component Registry Number
Co	53	7440-48-4
Cr	30	7440-47-3
W	7	7440-33-7
Ni	4.5	7440-02-0
Mo	2	7439-98-7
C	1.5	7440-44-0
Si	1	7440-21-3
Fe	0.5	7439-89-6
Mn	0.3	7439-96-5

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 140:290742 CA
TI Cobalt alloy for coating of components subject to erosion by liquids
IN Giannozzi, Massimo
PA Nuovo Pignone Holding S.P.A., Italy
SO Eur. Pat. Appl., 12 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM C23C024-10
ICS C22C019-07; B23K035-30
CC 56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1403397	A1	20040331	EP 2003-256034	20030925
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	US 2004106000	A1	20040603	US 2003-670121	20030925
	JP 2004169176	A2	20040617	JP 2003-333738	20030925

PRAI IT 2002-MI2056 20020927
AB The cobalt alloy comprises Cr 28-32, W 6-8, Si 0.1-2, C 1.2-1.7, Ni 3-6, and Mo 1-3% and may also comprise Fe and Mn ≤1% each. The typical Co alloys contains Cr 30, W 7, Si 1, C 1.5, Ni 4.5, Fe <0.3, Mn <0.3, and Mo 1.8. The alloy is especially suitable for laser cladding to provide protective coatings for the vapor turbine blades.
ST cobalt alloy laser cladding coating turbine blade
IT Turbines
(blades; cobalt alloy for coating of turbine blades)
IT Coating materials
Laser cladding
(cobalt alloy for coating of turbine blades)
IT Corrosion
Erosion (wear)
(erosion-corrosion; cobalt alloy for coating of turbine blades)
IT 676123-33-4 676123-34-5 676123-35-6 676123-36-7 676123-37-8

RL: TEM (Technical or engineered material use); USES (Uses)
(cobalt alloy for coating of turbine blades)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Crook, P; US 4415532 A 1983 CAPLUS
(2) Fuji, V; EP 0759500 A 1997 CAPLUS
(3) Giorni, E; Proc Conf EUROMAT 99 1999, V11, P76
(4) Livsey, N; US 4269868 A 1981 CAPLUS
(5) Mori, K; US 5084113 A 1992 CAPLUS

L10 ANSWER 3 OF 17 REGISTRY COPYRIGHT 2005 ACS on STN
RN 676123-35-6 REGISTRY
ED Entered STN: 19 Apr 2004
CN Cobalt alloy, base, Co 47,Cr 32,W 7.5,Ni 5.8,Mo 2.9,Si 1.8,C 1.6,Fe 0.9,Mn 0.8 (9CI) (CA INDEX NAME)
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS, USPATFULL
DT.CA CAplus document type: Patent
RL.P Roles from patents: USES (Uses)

Component	Component Percent	Component Registry Number
Co	47	7440-48-4
Cr	32	7440-47-3
W	7.5	7440-33-7
Ni	5.8	7440-02-0
Mo	2.9	7439-98-7
Si	1.8	7440-21-3
C	1.6	7440-44-0
Fe	0.9	7439-89-6
Mn	0.8	7439-96-5

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 140:290742 CA
TI Cobalt alloy for coating of components subject to erosion by liquids
IN Giannozzi, Massimo
PA Nuovo Pignone Holding S.P.A., Italy
SO Eur. Pat. Appl., 12 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM C23C024-10
ICS C22C019-07; B23K035-30
CC 56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1403397	A1	20040331	EP 2003-256034	20030925
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	US 2004106000	A1	20040603	US 2003-670121	20030925
	JP 2004169176	A2	20040617	JP 2003-333738	20030925

PRAI IT 2002-MI2056 20020927

AB The cobalt alloy comprises Cr 28-32, W 6-8, Si 0.1-2, C 1.2-1.7, Ni 3-6, and Mo 1-3% and may also comprise Fe and Mn ≤1% each. The typical Co alloys contains Cr 30, W 7, Si 1, C 1.5, Ni 4.5, Fe <0.3, Mn <0.3, and Mo 1.8. The alloy is especially suitable for laser cladding to provide protective coatings for the vapor turbine blades.

```
ST   cobalt alloy laser cladding coating turbine blade
IT   Turbines
        (blades; cobalt alloy for coating of turbine blades)
IT   Coating materials
     Laser cladding
        (cobalt alloy for coating of turbine blades)
IT   Corrosion
     Erosion (wear)
        (erosion-corrosion; cobalt alloy for coating of turbine blades)
IT   676123-33-4   676123-34-5   676123-35-6   676123-36-7   676123-37-8
     RL: TEM (Technical or engineered material use); USES (Uses)
        (cobalt alloy for coating of turbine blades)
RE.CNT  5      THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Crook, P; US 4415532 A 1983 CAPLUS
(2) Fuji, V; EP 0759500 A 1997 CAPLUS
(3) Giorni, E; Proc Conf EUROMAT`99 1999, V11, P76
(4) Livsey, N; US 4269868 A 1981 CAPLUS
(5) Mori, K; US 5084113 A 1992 CAPLUS

L10  ANSWER 4 OF 17  REGISTRY  COPYRIGHT 2005 ACS on STN
RN   676123-33-4  REGISTRY
ED   Entered STN:  19 Apr 2004
CN   Cobalt alloy, base, Co 54,Cr 30,W 7,Ni 4.5,Mo 1.8,C 1.5,Si 1,Fe 0-0.3,Mn
     0-0.3 (9CI)  (CA INDEX NAME)
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
SR   CA
LC   STN Files:   CA, CAPLUS, USPATFULL
DT.CA  CAplus document type:  Patent
RL.P   Roles from patents:  USES (Uses)

Component   Component        Component
             Percent      Registry Number
=========+============+===============
    Co         54             7440-48-4
    Cr         30             7440-47-3
    W           7             7440-33-7
    Ni          4.5           7440-02-0
    Mo          1.8           7439-98-7
    C           1.5           7440-44-0
    Si          1             7440-21-3
    Fe       0  -    0.3      7439-89-6
    Mn       0  -    0.3      7439-96-5

               1 REFERENCES IN FILE CA (1907 TO DATE)
               1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE  1

AN   140:290742  CA
TI   Cobalt alloy for coating of components subject to erosion by liquids
IN   Giannozzi, Massimo
PA   Nuovo Pignone Holding S.P.A., Italy
SO   Eur. Pat. Appl., 12 pp.
     CODEN: EPXXDW
DT   Patent
LA   English
IC   ICM  C23C024-10
     ICS  C22C019-07; B23K035-30
CC   56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1
     PATENT NO.         KIND  DATE          APPLICATION NO.   DATE
     ---------------    ----  --------      ---------------   --------
PI   EP 1403397          A1   20040331      EP 2003-256034    20030925
```

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK

US 2004106000 A1 20040603 US 2003-670121 20030925
JP 2004169176 A2 20040617 JP 2003-333738 20030925

PRAI IT 2002-MI2056 20020927

AB The cobalt alloy comprises Cr 28-32, W 6-8, Si 0.1-2, C 1.2-1.7, Ni 3-6, and Mo 1-3% and may also comprise Fe and Mn ≤1% each. The typical Co alloys contains Cr 30, W 7, Si 1, C 1.5, Ni 4.5, Fe <0.3, Mn <0.3, and Mo 1.8. The alloy is especially suitable for laser cladding to provide protective coatings for the vapor turbine blades.

ST cobalt alloy laser cladding coating turbine blade

IT Turbines
(blades; cobalt alloy for coating of turbine blades)

IT Coating materials
Laser cladding
(cobalt alloy for coating of turbine blades)

IT Corrosion
Erosion (wear)
(erosion-corrosion; cobalt alloy for coating of turbine blades)

IT 676123-33-4 676123-34-5 676123-35-6 676123-36-7 676123-37-8
RL: TEM (Technical or engineered material use); USES (Uses)
(cobalt alloy for coating of turbine blades)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Crook, P; US 4415532 A 1983 CAPLUS
(2) Fuji, V; EP 0759500 A 1997 CAPLUS
(3) Giorni, E; Proc Conf EUROMAT 99 1999, V11, P76
(4) Livsey, N; US 4269868 A 1981 CAPLUS
(5) Mori, K; US 5084113 A 1992 CAPLUS

L10 ANSWER 5 OF 17 REGISTRY

RN 675607-61-1 REGISTRY
ED Entered STN: 15 Apr 2004
CN Cobalt alloy, base, Co 51-65,Cr 28-32,W 5-7,Ni 0.5-3,Si 0.1-2,C 1.2-1.7,Mo 0.2-1,Fe 0-1,Mn 0-1 (9CI) (CA INDEX NAME)
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS, USPATFULL
DT.CA CAplus document type: Patent
RL.P Roles from patents: USES (Uses)

Component	Component Percent	Component Registry Number
Co	51 - 65	7440-48-4
Cr	28 - 32	7440-47-3
W	5 - 7	7440-33-7
Ni	0.5 - 3	7440-02-0
Si	0.1 - 2	7440-21-3
C	1.2 - 1.7	7440-44-0
Mo	0.2 - 1	7439-98-7
Fe	0 - 1	7439-89-6
Mn	0 - 1	7439-96-5

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 140:290741 CA
TI Cobalt alloy for erosion-resistant coating on alloy parts of vapor-type turbines
IN Giannozzi, Massimo
PA Nuovo Pignone Holding S.p.A., Italy

SO   Eur. Pat. Appl., 9 pp.
     CODEN: EPXXDW
DT   Patent
LA   English
IC   ICM C23C024-10
     ICS C22C019-07; F01D005-28
CC   56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	---------------	----	--------	---------------	--------
PI	EP 1403398	A2	20040331	EP 2003-256035	20030925
	EP 1403398	A3	20040414		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	JP 2004270023	A2	20040930	JP 2003-333737	20030925
	US 2004091639	A1	20040513	US 2003-697973	20031031

PRAI IT 2002-MI2057   20020927
AB   The erosion resistance to droplet impact on vapor-turbine parts is increased by coating the parts with Co alloy containing Cr 28-32, W 5-7, Si 0.1-2, C 1.2-1.7, Ni 0.5-3, Fe 0.01-1, Mn 0.01-1, and Mo 0.2-1, and impurities ≤0.5% by weight The Co-alloy coating is suitable for blades in vapor-type turbines, and can be applied by powder spray for laser-beam cladding with the nominal thickness of 0.8-3.2 mm. The typical Co alloy contains Cr 28, W 5.1, Si 0.1, C 1.2, Ni 0.5, Fe 0.01, Mn 0.01, and Mo 0.2% by weight
ST   cobalt chromium tungsten alloy coating turbine erosion resistance; vapor turbine droplet resistance cobalt chromium alloy coating
IT   Turbines
        (blades, impact-resistant, Co-alloy coating on; Co-Cr-W alloy coating resistant to droplet impact erosion on vapor-turbine parts)
IT   Cladding
        (laser-beam, with Co-alloy powder feed; Co-Cr-W alloy coating resistant to droplet impact erosion on vapor-turbine parts)
IT   Turbines
        (vapor, Co-alloy coating for; Co-Cr-W alloy coating resistant to droplet impact erosion on vapor-turbine parts)
IT   675607-61-1
     RL: TEM (Technical or engineered material use); USES (Uses)
        (alloying of; Co-Cr-W alloy coating resistant to droplet impact erosion on vapor-turbine parts)
IT   675607-62-2   675607-63-3   675607-64-4
     RL: TEM (Technical or engineered material use); USES (Uses)
        (coating from; Co-Cr-W alloy coating resistant to droplet impact erosion on vapor-turbine parts)

L10 ANSWER 6 OF 17 REGISTRY COPYRIGHT 2005 ACS on STN
RN   488092-37-1 REGISTRY
ED   Entered STN: 10 Feb 2003
CN   Cobalt alloy, base, Co 0-95,Cr 5-30,Ni 0-25,Mo 0-15,W 0-15,C 0-5,Fe 0-5,Mn 0-5,Si 0-5 (9CI) (CA INDEX NAME)
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
SR   CA
LC   STN Files: CA, CAPLUS, USPATFULL
DT.CA CAplus document type: Patent
RL.P   Roles from patents: PREP (Preparation); PRP (Properties); USES (Uses)

Component	Component Percent	Component Registry Number
Co	0 - 95	7440-48-4
Cr	5 - 30	7440-47-3
Ni	0 - 25	7440-02-0
Mo	0 - 15	7439-98-7

```
    W       0  -  15      7440-33-7
    C       0  -   5      7440-44-0
    Fe      0  -   5      7439-89-6
    Mn      0  -   5      7439-96-5
    Si      0  -   5      7440-21-3

               1 REFERENCES IN FILE CA (1907 TO DATE)
               1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE  1

AN    138:110563  CA
TI    Sintered tin-containing cobalt and nickel alloys with improved bearing
      sliding characteristics
IN    Whitaker, Lain Robert; Pavey, Richard Jameson
PA    Federal-Mogul Sintered Products Ltd., UK
SO    PCT Int. Appl., 22 pp.
      CODEN: PIXXD2
DT    Patent
LA    English
IC    ICM  C22C001-04
CC    56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1
      PATENT NO.        KIND  DATE          APPLICATION NO.  DATE
      ---------------   ----  --------      ---------------  --------
PI    WO 2003004711      A1   20030116      WO 2002-GB2911   20020625
          W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
              CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
              GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
              LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH,
              PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ,
              UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU,
              TJ, TM
          RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,
              CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,
              BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
      GB 2392168         A1   20040225      GB 2003-29418    20020625
      GB 2392168         B2   20041222
      EP 1412547         A1   20040428      EP 2002-782469   20020625
          R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
              IE, SI, LT, LV, FI, RO, MK, CY, AL, TR
      JP 2004533543      T2   20041104      JP 2003-510468   20020625
      US 2004237712      A1   20041202      US 2004-482253   20040524
PRAI GB 2001-16203      20010703
      WO 2002-GB2911     20020625
AB    The material comprises an alloy selected from one of the groups having a
      composition comprising in weight %: either Cr 5-30, Mo 0-15, Ni 0-25, W 0-15, C
      0-5, Si 0-5, Fe 0-5, Mn 0-5%, Co balance, or Cr 10-20, Mo 0-15, Co 0-20, W
      0-5, Fe 0-20, Al 0-5, Ti 0-5%, Ni balance; the said alloy having
      incorporated Sn 3-15% and optionally 1-6% of a solid lubricant material.
      Molybdenum disulfide or tungsten disulfide may be used as the solid
      lubricants.  The alloys have decreased shrinkage and are suitable for
      turbochargers of internal combustion engines; their use increases the
      power output and decreases the emission.
ST    tin cobalt solid lubricant alloy shrinkage bearing; nickel tin solid
      lubricant alloy shrinkage bearing
IT    Bearings
      Contraction (mechanical)
      Hardness (mechanical)
         (sintered tin-containing cobalt and nickel alloys with improved bearing
         sliding characteristics)
IT    Density
         (sintered; sintered tin-containing cobalt and nickel alloys with improved
         bearing sliding characteristics)
```

IT   Internal combustion engines
        (turbochargers; sintered tin-containing cobalt and nickel alloys with
        improved bearing sliding characteristics)
IT   1317-33-5, Molybdenum disulfide, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (alloy additive; sintered tin-containing cobalt and nickel alloys with
        improved bearing sliding characteristics)
IT   12638-07-2P, Stellite 31   51141-95-8P, Tribaloy T400   488092-37-1P,
     Carbon 0-5, chromium 5-30, cobalt-5-95, iron 0-5, manganese 0-5,
     molybdenum 0-15, nickel 0-25, silicon 0-5, tungsten 0-15   488092-38-2P,
     Aluminum 0-5, chromium 10-20, cobalt 0-20, iron 0-20, molybdenum 0-15,
     nickel 10-90, titanium 0-5, tungsten 0-5
     RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
     engineered material use); PREP (Preparation); USES (Uses)
        (alloy base; sintered tin-containing cobalt and nickel alloys with improved
        bearing sliding characteristics)
IT   7440-31-5, Tin, uses   12138-09-9, Tungsten disulfide
     RL: MOA (Modifier or additive use); USES (Uses)
        (solid lubricant, alloy additive; sintered tin-containing cobalt and nickel
        alloys with improved bearing sliding characteristics)
RE.CNT 3   THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Clough, G; US 3461069 A 1969
(2) Davis, J; Nickel, cobalt and their alloys 2000, P58
(3) Lesgourgues, J; US 4272290 A 1981 CAPLUS

L10 ANSWER 7 OF 17 REGISTRY COPYRIGHT 2005 ACS on STN
RN   314777-59-8 REGISTRY
ED   Entered STN: 18 Jan 2001
CN   Cobalt alloy, base, Co 51-70,Cr 26-32,W 3-6,Fe 0-3,Ni 0-3,Si 0.4-2,C
     0.9-1.4,Mn 0-1,Mo 0-1 (9CI) (CA INDEX NAME)
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
SR   CA
LC   STN Files: CA, CAPLUS
DT.CA CAplus document type: Patent
RL.P   Roles from patents: PROC (Process)

Component	Component Percent	Component Registry Number
Co	51 - 70	7440-48-4
Cr	26 - 32	7440-47-3
W	3 - 6	7440-33-7
Fe	0 - 3	7439-89-6
Ni	0 - 3	7440-02-0
Si	0.4 - 2	7440-21-3
C	0.9 - 1.4	7440-44-0
Mn	0 - 1	7439-96-5
Mo	0 - 1	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN   134:74888 CA
TI   Heat treatment of cobalt alloy for prevention of cracking in welding to
     carbon steel
IN   Okano, Masatoshi; Honda, Hitoshi
PA   Okano Valve Seizo K. K., Japan
SO   Jpn. Kokai Tokkyo Koho, 6 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese

IC ICM C22F001-10
ICS C22C019-07; C22F001-00
CC 56-9 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001003149	A2	20010109	JP 1999-172685	19990618
	JP 3263378	B2	20020304		

PRAI JP 1999-172685 19990618
AB A Co alloy containing C 0.9-1.4, Mn ≤1.0, SI 0.4-2.0, Cr 26.0-32.0, W 3.0-6.0, Mo ≤1.0, Ni ≤3.0, and Fe ≤3.0% is welded to carbon steel and when the Fe content becomes ≥5.0%, it is heated to ≥700°. The heat treatment suppresses the decrease in grain boundary cracking resistance of the Co alloy in arc welding such as PTA welding or TIG welding.
ST cobalt alloy welding carbon steel cracking prevention heat treatment
IT Crack (fracture)
Heat treatment
Welding of metals
(heat treatment of cobalt alloy for prevention of cracking in welding to carbon steel)
IT 11121-90-7, Carbon steel, processes 314777-46-3 314777-47-4
314777-48-5 314777-49-6 314777-50-9 314777-51-0 314777-52-1
314777-53-2 314777-54-3 314777-55-4 314777-56-5 314777-57-6
314777-58-7 314777-59-8
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(heat treatment of cobalt alloy for prevention of cracking in welding to carbon steel)

L10 ANSWER 8 OF 17 REGISTRY COPYRIGHT 2005 ACS on STN
RN 251447-93-5 REGISTRY
ED Entered STN: 21 Dec 1999
CN Cobalt alloy, base, Co 51-70,Cr 26-32,W 3-6,Fe 0-3,Ni 0-3,Si 0-2,C 0.9-1.4,Mn 0-1,Mo 0-1 (9CI) (CA INDEX NAME)
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Patent
RL.P Roles from patents: PRP (Properties); USES (Uses)

Component	Component Percent	Component Registry Number
Co	51 - 70	7440-48-4
Cr	26 - 32	7440-47-3
W	3 - 6	7440-33-7
Fe	0 - 3	7439-89-6
Ni	0 - 3	7440-02-0
Si	0 - 2	7440-21-3
C	0.9 - 1.4	7440-44-0
Mn	0 - 1	7439-96-5
Mo	0 - 1	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 132:14685 CA
TI Steam turbine blade with bucket cover and steam turbine using the blade
IN Kondo, Yoshiyuki; Oyama, Koji
PA Mitsubishi Heavy Industries, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.

```
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  F01D005-28
     ICS  C22C019-07; F01D005-22
CC   56-6 (Nonferrous Metals and Alloys)
     Section cross-reference(s): 55
FAN.CNT 1
     PATENT NO.          KIND  DATE          APPLICATION NO.  DATE
     ---------------     ----  --------      ---------------  --------
PI   JP 11336502         A2    19991207      JP 1998-145939   19980527
PRAI JP 1998-145939      19980527
AB   In the title blade having a bucket cover at the tip, the planes in contact
     with adjacent bucket covers are coated with a Co alloy containing Cr 26-32, W
     3-6, Fe <3, Mo <1, Ni <3, C 0.9-1.4, Si <2, and Mn <1 weight%, and the
     coatings are formed by welding.  The steam turbine having the blades is
     also claimed.  The cover has high wear resistance, and the turbine can be
     operated with high safety and has long life.
ST   steam turbine blade bucket cover; cobalt alloy welding cover turbine
     blade; wear resistant coating cover turbine blade
IT   Coating materials
        (abrasion-resistant; steam turbine blade having bucket cover coated
        with wear-resistant Co alloy for long life)
IT   Turbines
        (steam, blades; steam turbine blade having bucket cover coated with
        wear-resistant Co alloy for long life)
IT   12611-80-2, SUS 630
     RL: DEV (Device component use); PEP (Physical, engineering or chemical
     process); PROC (Process); USES (Uses)
        (steam turbine blade having bucket cover coated with wear-resistant Co
        alloy for long life)
IT   11105-35-4, Stellite 6   251447-93-5
     RL: DEV (Device component use); PRP (Properties); USES (Uses)
        (steam turbine blade having bucket cover coated with wear-resistant Co
        alloy for long life)

L10  ANSWER 9 OF 17  REGISTRY  COPYRIGHT 2005 ACS on STN
RN   187397-86-0  REGISTRY
ED   Entered STN:  21 Mar 1997
CN   Cobalt alloy, base, Co 0-71,Cr 20-35,Mo 2-20,Nb 2-20,V 2-20,W 2-20,Cu
     0-20,Fe 0-20,Hf 0-20,Mn 0-20,Ni 0-20,Pd 0-20,Ta 0-20,Ti 0-20,Al 1-8,C
     0-1,Si 0-1 (9CI)  (CA INDEX NAME)
MF   C . Al . Co . Cr . Cu . Fe . Hf . Mn . Mo . Nb . Ni . Pd . Si . Ta . Ti .
     V . W
CI   AYS
SR   CA
LC   STN Files:   CA, CAPLUS
DT.CA  CAplus document type:  Patent
RL.P   Roles from patents:  BIOL (Biological study); USES (Uses)
```

Component	Component Percent	Component Registry Number
Co	0 - 71	7440-48-4
Cr	20 - 35	7440-47-3
Mo	2 - 20	7439-98-7
Nb	2 - 20	7440-03-1
V	2 - 20	7440-62-2
W	2 - 20	7440-33-7
Cu	0 - 20	7440-50-8
Fe	0 - 20	7439-89-6
Hf	0 - 20	7440-58-6
Mn	0 - 20	7439-96-5
Ni	0 - 20	7440-02-0

Pd	0 - 20	7440-05-3
Ta	0 - 20	7440-25-7
Ti	0 - 20	7440-32-6
Al	1 - 8	7429-90-5
C	0 - 1	7440-44-0
Si	0 - 1	7440-21-3

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 126:203758 CA
TI Alloys for dental prostheses based on aluminum-chromium-cobalt
PA Bourrelly, Georges, Fr.; Prasad, Arun
SO Fr. Demande, 9 pp.
CODEN: FRXXBL
DT Patent
LA French
IC ICM A61K006-04
ICS A61K006-027
CC 63-7 (Pharmaceuticals)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2733416	A1	19961031	FR 1995-5437	19950428
	FR 2733416	B1	19970725		

PRAI FR 1995-5437 19950428
AB An alloy for dental prosthesis based on Cr-Co containing at least 1% Si and 1-8% Al has good adhesion to bone. The alloy shows reduced oxidation properties to heat and can bes useful as dental implants and can serve as supports for ceramics or resins. The ranges for all these alloys are given.
ST dental alloy aluminum chromium cobalt prosthesis
IT Dental materials and appliances
(alloys; alloys for dental prostheses based on aluminum-chromium-cobalt)
IT Dental materials and appliances
(implants; alloys for dental prostheses based on aluminum-chromium-cobalt)
IT 187397-79-1 187397-81-5 187397-84-8 187397-86-0 187683-30-3
187683-31-4 187683-32-5 187683-33-6
RL: DEV (Device component use); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(alloys for dental prostheses based on aluminum-chromium-cobalt)

L10 ANSWER 10 OF 17 REGISTRY COPYRIGHT 2005 ACS on STN
RN 165307-74-4 REGISTRY
ED Entered STN: 27 Jul 1995
CN Cobalt alloy, base, Co 52-62,Cr 29,W 8,Fe 0-3,Ni 0-3,Si 0-2,C 1.4,Mn 0-1,Mo 0-1 (9CI) (CA INDEX NAME)
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Patent
RL.P Roles from patents: USES (Uses)

Component	Component Percent	Component Registry Number
Co	52 - 62	7440-48-4
Cr	29	7440-47-3
W	8	7440-33-7

```
    Fe       0  -  3       7439-89-6
    Ni       0  -  3       7440-02-0
    Si       0  -  2       7440-21-3
    C          1.4         7440-44-0
    Mn       0  -  1       7439-96-5
    Mo       0  -  1       7439-98-7

               1 REFERENCES IN FILE CA (1907 TO DATE)
               1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE  1

AN    123:90408  CA
TI    Rolling bearings in molten zinc baths
IN    Asahi, Ichiro; Ebata, Sadao
PA    Kawasaki Steel Co, Japan
SO    Jpn. Kokai Tokkyo Koho, 4 pp.
      CODEN: JKXXAF
DT    Patent
LA    Japanese
IC    ICM  C23C002-00
      ICS  C22C019-07; F16C033-62
CC    56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1
      PATENT NO.        KIND  DATE          APPLICATION NO.   DATE
      ---------------   ----  --------      ---------------   --------
PI    JP 07097668        A2   19950411      JP 1993-242894    19930929
      JP 3212198         B2   20010925
PRAI JP 1993-242894     19930929
AB    The bearings consist of Co alloys containing Cr 24.0-32.0, W 3.0-14.0, C
      1.0-3.0, Fe ≤3.0, Ni ≤3.0, Si ≤2.0, Mn ≤1.0,
      and Mo ≤1.0 weight%.  The products, especially suitable for galvanization,
      have high resistance to heat, erosion, and wear.
ST    cobalt chromium tungsten alloy bearing; roll bearing cobalt alloy
      galvanization
IT    Bearings
      Galvanization
         (rolling bearings containing Co alloys for galvanization)
IT    165307-72-2   165307-73-3   165307-74-4   165307-75-5   165307-76-6
      165307-77-7
      RL: DEV (Device component use); TEM (Technical or engineered material
      use); USES (Uses)
         (rolling bearings containing Co alloys for galvanization)

L10   ANSWER 11 OF 17  REGISTRY  COPYRIGHT 2005 ACS on STN
RN    152324-06-6  REGISTRY
ED    Entered STN:  18 Jan 1994
CN    Cobalt alloy, base, Co 48-71,Cr 25.0-32.0,W 3.00-6.00,Fe 0-5.00,Ni
      0-3.00,Mn 0-2.00,Si 0-2.00,C 0.70-1.40,Mo 0-1.00 (UNS W73006) (9CI)  (CA
      INDEX NAME)
OTHER NAMES:
CN    ASME SFA5.13-ECoCr-A
CN    AWS A5.13-ECoCr-A
CN    AWS ECoCr-A
CN    ECoCr-A
CN    Stellite 6 electrode
CN    UNS W73006
CN    W73006
MF    C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI    AYS
SR    CA
LC    STN Files:   CA, CAPLUS
DT.CA  CAplus document type:  Conference
RL.NP  Roles from non-patents:  USES (Uses)
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Component	Component Percent	Component Registry Number
Co	48 - 71	7440-48-4
Cr	25.0 - 32.0	7440-47-3
W	3.00 - 6.00	7440-33-7
Fe	0 - 5.00	7439-89-6
Ni	0 - 3.00	7440-02-0
Mn	0 - 2.00	7439-96-5
Si	0 - 2.00	7440-21-3
C	0.70 - 1.40	7440-44-0
Mo	0 - 1.00	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 120:59512 CA
TI Study of dilution of high alloy overlays
AU Chattopadhyay, R.; Kammer, P. A.
CS Ewac Alloys Ltd., Bombay, India
SO Int. Trends Weld. Sci. Technol., Proc. Int. Conf. Trends Weld. Res., 3rd (1993), Meeting Date 1992, 455-60. Editor(s): David, Stan A.; Vitek, J. M. Publisher: ASM, Materials Park, Ohio.
CODEN: 59GAAM
DT Conference
LA English
CC 55-9 (Ferrous Metals and Alloys)
AB The high alloy overlays of ECoCrA and ENiCrMo-4 were diluted by iron from the mild steel substrate to different extents, depending on the welding process and parameters. The dilution of major alloy constituents can be >30% in manual metal-arc welding. The dilution in plasma transfered-arc welding using powder alloys can be controlled within 5-10%. The effect of dilution in the overlays using both processes on the microstructure, hardness, wear, and corrosion properties were studied.
ST steel diln overlay welding
IT Welding
(metal-arc and plasma transfered-arc, overlay, on steel, dilution during)
IT 140409-79-6, ENiCrMo4 152324-06-6, ECoCrA
RL: USES (Uses)
(welding with overlays of, on steel, dilution during)
IT 12597-69-2
RL: USES (Uses)
(welding, metal-arc and plasma transfered-arc, overlay, on steel, dilution during)

L10 ANSWER 12 OF 17 REGISTRY COPYRIGHT 2005 ACS on STN
RN 144321-08-4 REGISTRY
ED Entered STN: 06 Nov 1992
CN Cobalt alloy, base, Co 45-67,Cr 25.0-32.0,W 7.00-9.50,Fe 0-5.00,Ni 0-3.00,Mn 0-2.00,Si 0-2.00,C 1.00-1.70,Mo 0-1.00 (UNS W73012) (9CI) (CA INDEX NAME)
OTHER NAMES:
CN AWS ECoCr-B
CN ECoCr-B
CN Stellite 12 electrode
CN UNS W73012
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Journal

RL.NP Roles from non-patents: USES (Uses)

Component	Component Percent	Component Registry Number
Co	45 - 67	7440-48-4
Cr	25.0 - 32.0	7440-47-3
W	7.00 - 9.50	7440-33-7
Fe	0 - 5.00	7439-89-6
Ni	0 - 3.00	7440-02-0
Mn	0 - 2.00	7439-96-5
Si	0 - 2.00	7440-21-3
C	1.00 - 1.70	7440-44-0
Mo	0 - 1.00	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 117:217001 CA
TI Effect of welding variables on cracking in cobalt-based SMA hardfacing deposits
AU Sharples, R. V.; Gooch, T. G.
CS Weld. Inst., Abington Hall, Cambridge, UK
SO Welding Research (Miami, FL, United States) (1992), (May), 195-200
Published in: Weld. J. (Miami), 71(5)
CODEN: WERSA3; ISSN: 0096-7629
DT Journal
LA English
CC 55-9 (Ferrous Metals and Alloys)
AB Cracking in Co alloy shielded metal arc (SMA) deposits decreased with increasing current and preheat temperature for single- and two-layer deposits. Limiting conditions for deposit cracking were defined in terms of deposit dilution and cooling rate.
ST cobalt alloy hardfacing deposit cracking; welding variable hardfacing cracking; carbon steel surfacing cobalt alloy
IT Welds
(surfacings, of cobalt alloy on carbon steel, cracking of, welding parameter effect on)
IT Welding
(surfacing, of carbon steel with cobalt alloy, cracking in)
IT 39303-63-4, 080A42, miscellaneous
RL: MSC (Miscellaneous)
(cobalt alloy hardfacings on, cracking of, welding variable effect on)
IT 144321-08-4, ECoCrB
RL: USES (Uses)
(hardfacings of, on carbon steel, cracking of, welding variable effect on)
IT 12597-69-2
RL: USES (Uses)
(welding, surfacing, of carbon steel with cobalt alloy, cracking in)
IT 12597-69-2
RL: USES (Uses)
(welds, surfacings, of cobalt alloy on carbon steel, cracking of, welding parameter effect on)

L10 ANSWER 13 OF 17 REGISTRY COPYRIGHT 2005 ACS on STN
RN 100309-96-4 REGISTRY
ED Entered STN: 15 Feb 1986
CN Cobalt alloy, base, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si 0-2,C 0.7-1.4,Mo 0-1 (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Carbon alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si

0-2,C 0.7-1.4,Mo 0-1
CN   Chromium alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si 0-2,C 0.7-1.4,Mo 0-1
CN   Iron alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si 0-2,C 0.7-1.4,Mo 0-1
CN   Manganese alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si 0-2,C 0.7-1.4,Mo 0-1
CN   Molybdenum alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si 0-2,C 0.7-1.4,Mo 0-1
CN   Nickel alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si 0-2,C 0.7-1.4,Mo 0-1
CN   Silicon alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si 0-2,C 0.7-1.4,Mo 0-1
CN   Tungsten alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si 0-2,C 0.7-1.4,Mo 0-1
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
SR   CA
LC   STN Files: CA, CAPLUS, USPATFULL
DT.CA   CAplus document type: Patent
RL.P   Roles from patents: PREP (Preparation); PROC (Process)

Component	Component Percent	Component Registry Number
Co	48 - 70	7440-48-4
Cr	26 - 32	7440-47-3
W	3 - 6	7440-33-7
Fe	0 - 5	7439-89-6
Ni	0 - 3	7440-02-0
Mn	0 - 2	7439-96-5
Si	0 - 2	7440-21-3
C	0.7 - 1.4	7440-44-0
Mo	0 - 1	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN   104:73424   CA
TI   Metal strip
IN   Davies, Idwal; Bellis, John
PA   Mixalloy Ltd., UK
SO   Eur. Pat. Appl., 21 pp.
     CODEN: EPXXDW
DT   Patent
LA   English
IC   ICM   B22F003-22
     ICS   B22F003-18; C22C032-00
ICA   B23K035-40
CC   56-4 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 162555	A1	19851127	EP 1985-302282	19850402
	R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE				
	AU 8540708	A1	19851010	AU 1985-40708	19850329
	AU 568733	B2	19880107		
	ZA 8502483	A	19851127	ZA 1985-2483	19850402
	US 4602954	A	19860729	US 1985-719492	19850404
	JP 60230904	A2	19851116	JP 1985-72473	19850405

PRAI GB 1984-9047   19840407
AB   A metallic strip containing discrete particles of ≥1 addnl. dispersed

metallic or nonmetallic materials is prepared by forming a homogeneous mix of ductile metallic particles and a minor proportion of metallic and/or nonmetallic particles having chemical and/or phys. properties different from those of the ductile metallic particles. A slurry coating comprising a suspension of the mixed particles in a film forming cellulose derivative is deposited on a moving support surface, dried, and removed from the support surface before being subjected to rolling to effect compaction of the ductile content of the strip and sintering at a temperature at which the metallic particles coalesce to form a matrix containing particles of the addnl. metallic or nonmetallic material(s) which either remain as discrete particles or alloy with the matrix. Thus, for the production of Co-based hard-facing alloy strip, consumables of the Stellite type containing C 0.7-1.4, Cr 26-32, W 3-6, Si ≤2, Ni ≤3, Fe ≤5, Mn ≤2, Mo ≤1%, and Co balance were prepared

ST cobalt hard facing alloy strip

IT 100309-98-6P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of brazing strips of)

IT 100310-00-7P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of corrosion-resistant strips of)

IT 100309-96-4P 100309-97-5P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of hard-facing strips of)

IT 100309-95-3P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of strip of)

IT 100309-94-2P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of strip of, for hard facing weld cladding)

IT 100309-99-7P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of strips of)

L10 ANSWER 14 OF 17 REGISTRY COPYRIGHT 2005 ACS on STN
RN 89754-92-7 REGISTRY
ED Entered STN: 16 Nov 1984
CN Cobalt alloy, base, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Carbon alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Chromium alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Iron alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Manganese alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Molybdenum alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Nickel alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Silicon alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Tungsten alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
OTHER NAMES:
CN Stellite 158
MF C . B . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Conference
RL.NP Roles from non-patents: USES (Uses)

Component	Component Percent	Component Registry Number

Co	55	- 69	7440-48-4
Cr	24	- 28	7440-47-3
W	5	- 6	7440-33-7
Fe	0	- 3	7439-89-6
Ni	0	- 3	7440-02-0
Si	1	- 1.5	7440-21-3
C	0.5	- 1	7440-44-0
Mn	0	- 1	7439-96-5
Mo	0	- 1	7439-98-7
B	0.6	- 0.8	7440-42-8

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 100:160235 CA
TI Laser fusing of hardfacing alloy powders
AU Matthews, S. J.
CS Cabot Corp., USA
SO Lasers Mater. Process., Conf. Proc. (1983), 138-48. Editor(s): Metzbower, E. A. Publisher: ASM, Metals Park, Ohio.
CODEN: 51BNAE
DT Conference
LA English
CC 55-6 (Ferrous Metals and Alloys)
AB 1200 W CO_2 laser was used for hardfacing by fusion of a preplaced powder paste onto a steel substrate to give a fully solidified deposit 1.0-1.5 mm thick with little base-metal dilution A variety of complex Ni, Co, Fe, and WC alloy hardfacings were readily prepared Satisfactory deposit smoothness and microstructure were achieved by traversing the substrate at 6 in./min under a beam oscillation frequency of 75 Hz. The results were promising for com. use.
ST laser fusion alloy hardfacing; nickel alloy laser hardfacing steel; cobalt alloy laser hardfacing steel; iron alloy laser hardfacing steel; tungsten carbide laser hardfacing steel
IT Laser radiation, chemical and physical effects
(hard-facing by, of steel, by fusion of alloy powders)
IT Coating process
(hard-facing, of steel by laser fusion of alloy powders)
IT 11105-35-4 51141-96-9 89643-98-1 89644-00-8 89657-49-8 89754-92-7 89754-93-8
RL: USES (Uses)
(hardfacing with, on steel, by laser fusion of powder)

L10 ANSWER 15 OF 17 REGISTRY COPYRIGHT 2005 ACS on STN
RN 54425-10-4 REGISTRY
ED Entered STN: 16 Nov 1984
CN Cobalt alloy, base, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1 (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Carbon alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
CN Chromium alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
CN Iron alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
CN Manganese alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
CN Molybdenum alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
CN Nickel alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1

CN   Silicon alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si
     2,Mn 1-2,Mo 1
CN   Tungsten alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si
     2,Mn 1-2,Mo 1
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
LC   STN Files: CA, CAPLUS
DT.CA CAplus document type: Journal
RL.NP Roles from non-patents: USES (Uses)

Component	Component Percent	Component Registry Number
Co	38 - 64	7440-48-4
Cr	25 - 32	7440-47-3
W	3 - 14	7440-33-7
Fe	0 - 5	7439-89-6
Ni	3	7440-02-0
C	0.9 - 3	7440-44-0
Si	2	7440-21-3
Mn	1 - 2	7439-96-5
Mo	1	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN   81:157451 CA
TI   Arc-[weld] repairing with cobalt-chromium-x [carbon and other elements]
     alloys
AU   Van Muysen, L.
CS   K.V.T.I., Mechelen, Belg.
SO   Arcos (1974), 162, 4365-80
     CODEN: ARCOA3; ISSN: 0365-6012
DT   Journal
LA   French
CC   56-9 (Nonferrous Metals and Alloys)
AB   A filled wire electrode was developed for hard surfacing of new and used
     parts by arc welding. An improved arc welding wire was produced by
     forming Co strip to a tube with longitudinal seam and simultaneously
     filling it with alloying elements (Cr, W, C, Mo, Ni). The filled tube was
     then cold drawn to 3.2 mm diameter Application of the filled wire to
     submerged arc welding and metal arc welding with protective gas is
     described. The structure of single and triple layer deposits, influence
     of Fe dissolution, and hardness as a function of depth were determined for both
     methods. Examples are given for the industrial use of the wire.
ST   welding repair surfacing electrode; cobalt alloy welding electrode
IT   Welding
        (electrodes, cobalt-chromium alloys for hard facing)
IT   54425-09-1   54425-10-4   54500-11-7
     RL: USES (Uses)
        (for welding rods for hard-facing)
IT   7440-48-4, uses and miscellaneous
     RL: USES (Uses)
        (tubes for welding compns. for hard-facing)

L10 ANSWER 16 OF 17 REGISTRY COPYRIGHT 2005 ACS on STN
RN   12671-96-4 REGISTRY
ED   Entered STN: 16 Nov 1984
CN   Cobalt alloy, base, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn
     0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN   Carbon alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn

0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Chromium alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Iron alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Manganese alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Molybdenum alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Nickel alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Silicon alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Tungsten alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
OTHER NAMES:
CN 6B
CN AMS 5894
CN Haynes 6B
CN Haynes Stellite 6B
CN HS6B
CN R30016
CN S 6B
CN Stellite 6B
CN UNS R30016
DR 12743-58-7
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS, PROMT, USPAT2, USPATFULL
DT.CA CAplus document type: Conference; Journal; Patent; Report
RL.P Roles from patents: BIOL (Biological study); PRP (Properties); USES (Uses)
RL.NP Roles from non-patents: MSC (Miscellaneous); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses); NORL (No role in record)

Component	Component Percent	Component Registry Number
Co	47 - 69	7440-48-4
Cr	27 - 33	7440-47-3
W	3.0 - 6.0	7440-33-7
Fe	0 - 3.0	7439-89-6
Ni	0 - 3.0	7440-02-0
Mn	0 - 2.5	7439-96-5
Mo	0.5 - 2.0	7439-98-7
Si	0 - 2.0	7440-21-3
C	0.6 - 1.5	7440-44-0

130 REFERENCES IN FILE CA (1907 TO DATE)
130 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 140:427404 CA
TI Experimental investigation of high temperature wear resistant coatings for industrial gas turbine
AU Matsuoka, Hideyuki; Shinohara, Nobuo; Sugita, Yuji; Ichikawa, Kunihiro; Arikawa, Hideyuki; Nishi, Kazuya
CS Electric Power Research & Development Center, Chubu Electric Power Co., Inc., Midori-ku, Nagoya-shi, Aichi-ken, 459-8522, Japan
SO ASME Turbo Expo: Power for Land, Sea & Air, Atlanta, GA, United States, June 16-19, 2003 (2003), 1188-1192 Publisher: American Society of

Mechanical Engineers, New York, N. Y.
CODEN: 69ERFB; ISBN: 0-7918-3671-1

DT Conference; (computer optical disk)

LA English

CC 57-2 (Ceramics)
Section cross-reference(s): 56

AB In the contact section of industrial gas turbine parts, wear can be observed after normal operations. Especially, in the contact area of combustors and their fittings, such as a transition piece and a seal plate, the severe wear may occur owing to combustion vibration under high temperature If such severe wear occurs, repair of the combustor parts may be needed. Short cycles of inspection and repair will decrease the performance of the gas turbine. Though combustors and their fittings are subjected to high-temperature conditions without any lubricant, any relevant prevention has not been developed yet. In this paper, wear resistance of ceramic hard coating materials, i.e., titanium nitride (TiN), titanium aluminum nitride (TiAlN), chromium nitride (CrN), titanium carbide (TiC), silicon carbide (SiC), aluminum oxide (Al2O3) against various metals was tested under conditions similar to that found in gas turbines. These coatings were deposited by phys. vapor deposition (PVD) or chemical vapor deposition (CVD) processes. It was concluded that, the combination of Al2O3 coating and stellite #6B had excellent high temperature wear resistance.

ST ceramic coating wear resistance cobalt alloy substrate turbine environment ; titanium nitride coating wear resistance cobalt alloy turbine environment; aluminum titanium nitride coating wear resistance cobalt alloy turbine; chromium nitride coating wear resistance cobalt alloy turbine environment; silicon carbide coating wear resistance cobalt alloy turbine environment; alumina coating wear resistance cobalt alloy substrate turbine environment

IT Coating materials
(abrasion-resistant, ceramic; high-temperature oxidation and wear resistance of ceramic coatings on cobalt alloy substrates)

IT Oxidation
(high-temperature oxidation and wear resistance of ceramic coatings on cobalt alloy substrates in gas turbine environment)

IT 409-21-2, Silicon carbide (SiC), processes 1344-28-1, Aluminum oxide (Al2O3), processes 12070-08-5, Titanium carbide (TiC) 24094-93-7, Chromium nitride (CrN)
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(coating; high-temperature oxidation and wear resistance of ceramic coatings on cobalt alloy substrates)

IT 25583-20-4, Titanium nitride (TiN) 106389-69-9, Aluminum Titanium nitride altin
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(coating; high-temperature oxidation and wear resistance of ceramic coatings on cobalt alloy substrates in gas turbine environment)

IT 12671-96-4, Stellite #6B
RL: NUU (Other use, unclassified); USES (Uses)
(counterface; high-temperature oxidation and wear resistance of ceramic coatings on cobalt alloy substrates)

IT 12605-92-4, Hs-25
RL: NUU (Other use, unclassified); USES (Uses)
(substrate and counterface; high-temperature oxidation and wear resistance of

ceramic coatings on cobalt alloy substrates)
RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Adachi, K; Transactions of the Japan Society of Mechanical Engineers (C) 1995, V61, P2553
(2) Adachi, K; Transactions of the Japan Society of Mechanical Engineers (C) 1996, V62, P1047
(3) Destefani, J; Manufacturing Engineering 2002, V129, P47
(4) Kato, K; Surface and Coatings Technology 1995, V76-77, P469 CAPLUS
(5) Malshe, A; JOM 2002, V54, P28 CAPLUS
(6) Takahashi, T; Journal of the Gas Turbine Society of Japan 2001, V29, P338
(7) Umehara, N; Transactions of the Japan Society of Mechanical Engineers (C) 1997, V63, P1336 CAPLUS
(8) Wilson, S; Advances in Industrial Materials 1998, P373 CAPLUS
(9) Wilson, S; Surface and Coatings Technology 1996, V86-87, P75 CAPLUS
(10) Wilson, S; Surface and Coatings Technology 1997, V94-95, P53 CAPLUS
(11) Yasuoka, M; Proceeding of the 1st International Conference on Tribology in Manufacturing Process '97 1997, P306

REFERENCE 2

AN 139:170497 CA
TI SNS target tests at the LANSCE-WNR in 2001 - Part II
AU Hunn, J. D.; Riemer, B. W.; Tsai, C. C.
CS Oak Ridge National Laboratory, Oak Ridge, TN, 37831-6138, USA
SO Journal of Nuclear Materials (2003), 318, 102-108
CODEN: JNUMAM; ISSN: 0022-3115
PB Elsevier Science B.V.
DT Journal
LA English
CC 71-6 (Nuclear Technology)
Section cross-reference(s): 55, 56
AB Stopping of an 800 MeV p pulse in liquid Hg, such as in the United States Spallation Neutron Source (SNS), leads to cavitation that can affect the Hg vessel. This paper discusses pitting that was observed on Hg container walls after 100-200 p pulses obtained at the Los Alamos Neutron Science Center Weapons Neutron Research facility (LANSCE-WNR). The degree of cavitation-induced pitting was dependent on the geometry and composition of the container. As expected, very hard surfaces were particularly effective for resisting deformation from cavity collapse.
ST spallation neutron source target container cavitation pitting corrosion
IT Corrosion
(pitting; spallation neutron generators target tests at the LANSCE-WNR)
IT Cavitation
Neutron generators
(spallation neutron generators target tests at the LANSCE-WNR)
IT 12671-96-4, Stellite-6B 39418-85-4, 316LN 59071-77-1, Nitronic-60
RL: PRP (Properties)
(spallation neutron generators target tests at the LANSCE-WNR)
RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Philipp, A; J Fluid Mech 1998, V361, P75 CAPLUS
(2) Riemer, B; These Proceedings, dio:10.1016/S0022-3115(03)00076-X

REFERENCE 3

AN 137:173141 CA
TI An analysis of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading
AU Lee, Min-Ku; Kim, Whung-Whoe; Rhee, Chang-Kyu; Lee, Won-Jong
CS Advanced Nuclear Materials Department, Korea Atomic Energy Research Institute, Taejon, 305-353, S. Korea
SO Nuclear Engineering and Design (2002), 214(3), 183-193
CODEN: NEDEAU; ISSN: 0029-5493
PB Elsevier Science B.V.
DT Journal

LA English
CC 56-12 (Nonferrous Metals and Alloys)
AB This research placed emphasis on the computer simulated stress distribution on the surface and in the bulk of the materials which are subjected to the water impact causing erosion damage. The erosion damage was predicted by evaluating the spatial and temporal stress wave distribution generated by water impact pressure on 12Cr steel and Stellite 6B as steam turbine materials and TiN as a hard coating material. There were two distinctive stress wave behaviors. Firstly, the large tensile stress at the surface was developed by the Rayleigh wave component which appeared between the water drop and the Rayleigh wave front. After the Rayleigh wave detached from the water drop, the materials were in the tensile stress state which could be related to fracture initiation. Secondly, the largest tensile stress in the bulk was near the surface due to the Rayleigh wave generated at the surface and decreased due to the enlargement of wave front as the radial distance increased. Rayleigh wave's shape was broadened due to the difference between the contact point velocity and the wave front velocity, while its value decayed exponentially in the depth direction. Also, there may be a tendency to produce a circumferential crack by σrr near the surface and a lateral crack by σzz in the sub-surface. The tensile stresses in TiN were much lower than those in 12Cr steel and Stellite 6B due to its higher wave velocity.
ST stress wave chromium steel Stellite titanium nitride impact loading; hard coating crack initiation titanium nitride steel Stellite stress
IT Hardfacing
Microcrack
Tension
(anal. of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading)
IT Corrosion
Erosion (wear)
(erosion-corrosion; anal. of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading)
IT Turbines
(steam; anal. of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading)
IT Wave
(stress; anal. of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading)
IT 12671-96-4, Stellite 6B 25583-20-4, Titanium nitride (TiN) 63498-70-4, 12Cr
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(anal. of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading)
RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Adler, W; J Mater Sci 1977, V12, P1253 CAPLUS
(2) Astm; Designation G73-82, Standard practice for liquid impingement erosion testing 1987, P267
(3) Behrendt, A; Proceedings of 4th International Conference on Rain Eros and Ass Phen 1974, P425
(4) Blowers, R; J Inst Maths Applics 1969, V5, P167
(5) Bowden, F; Proc R Soc Lond Ser A 1961, V263, P433
(6) Bowden, F; Proc R Soc Lond Ser A 1965, V282, P331
(7) Brunton, J; Proceedings of 9th International Conference on High-Speed Photogr, SMPTE 1970, P444
(8) Cook, S; Proc R Soc Lond Ser A 1928, V119, P481
(9) Evans, A; J Appl Phys 1980, V51, P2473 CAPLUS
(10) Hand, R; J Appl Phys 1991, V70, P7111 CAPLUS
(11) Hand, R; Ph D Thesis, Cavendish Labs, University of Cambridge 1987
(12) Heymann, F; J Appl Phys 1969, V40, P5113
(13) Jenkins, D; In Aerodynamic Capture Particles 1960, P97
(14) Kim, H; An analysis of stress wave propagation in an elastic half space to

impacts load 1996, CM-073/96, P36
(15) Lesser, M; Ann Rev Fluid Mech 1983, V15, P97
(16) Lesser, M; Proc R Soc Lond Series A 1981, V377, P289
(17) Obara, T; Wear 1995, V186, P388
(18) Rieger, H; Proceedings of third International Conference on Rain Eros and Ass Phen 1970, P147
(19) Seward, C; Studies of rain erosion mechanisms in a range of IR transmitting Ceramics-Including coated samples 1994, SPC-92-4032, P84

REFERENCE 4

AN 137:66499 CA
TI Erosion resistance of Ti-Ni shape-memory alloy to hot water jet
AU Niu, L. B.; Sakuma, T.; Takaku, H.; Kyougoku, H.; Sakai, Y.
CS Faculty of Engineering, Shinshu University, Nagano City, 380-8553, Japan
SO Materials Science Forum (2002), 394-395(Shape Memory Materials and Its Applications), 353-356
CODEN: MSFOEP; ISSN: 0255-5476
PB Trans Tech Publications Ltd.
DT Journal
LA English
CC 56-10 (Nonferrous Metals and Alloys)
AB The development of the Co-free materials with high erosion resistance is anticipated for the equipment parts in power plants. The erosion resistance against the impact of hot water jets onto the specimen surface was exptl. investigated for the Ti-Ni shape memory alloys (SMA), as compared with that of an existing Co-based alloy (Stellite). In total, the erosion resistance of Ti-Ni SMAs is superior to that of Stellite. The essential erosion-damage mechanism of Ti-Ni SMAs is the cavitation, and that of Sellite is the combination of the shearing stress and the cavitation. It is suggested that the Ti-Ni SMA will be the promising alternative materials of Stellite.
ST erosion resistance nickel titanium shape memory alloy water jet
IT Cavitation
Martensitic structure
Martensitic transformation
Shape memory effect
Surface structure
(erosion resistance of Ti-Ni shape-memory alloy to hot water jet)
IT Shape memory alloys
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(erosion resistance of Ti-Ni shape-memory alloy to hot water jet)
IT Erosion (wear)
(resistance; erosion resistance of Ti-Ni shape-memory alloy to hot water jet)
IT 11110-85-3, Nickel 50, titanium 50 (atomic) 51879-83-5, Nickel 51, titanium 49 (atomic)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(erosion resistance of Ti-Ni shape-memory alloy to hot water jet)
IT 12671-96-4, Stellite 6B
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(erosion resistance of Ti-Ni shape-memory alloy to hot water jet in relation to)
IT 7732-18-5, Water, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process)
(erosion resistance of Ti-Ni shape-memory alloy to hot water jet in relation to)
RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Iwata, U; Proc JSME-ASME Inter Conf on Power Engineering-93 1993, V1, P77
(2) Nakano, E; Trans Japan Soc Mech Eng 1998, V64A, P2555

(3) Oshida, Y; Corrosion Engineering 1990, V40, P1009
(4) Rush, D; Power 1993, V135-1, P30

REFERENCE 5

AN 136:56875 CA
TI Thermodynamic stability calculations in predicting corrosion behaviour at elevated temperature
AU Skrifvars, B. O.; Backman, R.
CS Process Chemistry Group, Abo Akademi University, Turku, FI-20500, Finland
SO Materials Science Forum (2001), 369-372(Pt. 2, High Temperature Corrosion and Protection of Materials, Volume 5, Part 2), 923-930
CODEN: MSFOEP; ISSN: 0255-5476
PB Trans Tech Publications Ltd.
DT Journal
LA English
CC 55-10 (Ferrous Metals and Alloys)
Section cross-reference(s): 68, 69
AB Multi-component, multi-phase equilibrium anal. was used to determine when corrosion attack may occur and when an alloy may be resistant to corrosion at elevated temps. Although chemical equilibrium anal. does not consider processes governed by mass transport (diffusion) or other kinetic constraints, it provides a useful way to study the potential for corrosion in different gas environments. Comparison of chemical equilibrium calcns. with the results of SEM investigations shows that equilibrium calcns. usefully characterize the corrosion resistance of metals and alloys. Some examples are given and, in the case of AISI 310 and Alloy 6B in a gasification environment, the agreement with practical experience is good. For corrosion in Diesel engines, calcns. indicate that some risk for carburization or metal dusting exists with the alloy 13CrMo44. For the alloy Nimonic 80A, calcns. indicate the presence of chromium oxides and aluminum oxides, and thus reduced corrosion risk.
ST stainless steel high temp corrosion thermodn stability; steel high temp corrosion thermodn stability; nickel superalloy high temp corrosion thermodn stability; cobalt superalloy high temp corrosion thermodn stability
IT Coal gasification
Diesel engines
(corrosion in; thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)
IT Scale (deposits)
(oxide, composition of; thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)
IT Corrosion
Phase equilibrium
(thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)
IT Superalloys
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)
IT 1308-38-9, Chromia, processes 1314-23-4, Zirconia, processes 1344-28-1, Alumina, processes 12068-49-4, Aluminum iron oxide Al2FeO4 12068-77-8, Chromium iron oxide Cr2FeO4
RL: CPS (Chemical process); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PRP (Properties); FORM (Formation, nonpreparative); PROC (Process)
(oxide scale component; thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)
IT 11068-71-6, Nimonic 80A 11109-50-5, Aisi 304 12597-69-2, Steel,

processes 12671-96-4 12725-29-0, Aisi 310 39380-93-3, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Anon; ChemSage Handbook Ver 3-0-1 GTT-Technologies 1994
(2) Bakker, W; Materials Science Forum 1997, V251-254, P575 CAPLUS
(3) Chou, S; Proc Symp Stationary Combust 1985, V1, P19/1
(4) Chu, H; Corrosion Science 1993, V35(5-8), P1091 CAPLUS
(5) Lai, G; High-Temperature Corrosion of Enginering Alloys 1990, P66
(6) McNallan, M; Materials Performance 1994, V33, P54 CAPLUS
(7) Roine, A; HSC Chemistry for Windows, Outokumpu Research

REFERENCE 6

AN 135:306926 CA
TI Plasma duplex treatment of Stellite
AU Pfohl, C.; Rie, K.-T.
CS Institut fur Oberflachentechnik und Plasmatechnische Werkstoffentwicklung, TU Braunschweig, Germany
SO Surface and Coatings Technology (2001), 142-144, 1116-1120
CODEN: SCTEEJ; ISSN: 0257-8972
PB Elsevier Science S.A.
DT Journal
LA English
CC 56-6 (Nonferrous Metals and Alloys)
AB Despite their excellent tribol. properties, the lifetime of Stellites in some applications in metallurgical and mech. engineering is not sufficient. The development of a duplex treatment for Stellite 6B, plasma nitriding (PN) or plasma nitrocarburizing (PNC), followed by the deposition of B-containing hard coatings (TiBN or TiB2) is described. The effect of the process parameters and the gas composition was studied. Compositional and structural anal. was performed by profilometry, XRD, SEM, wave length dispersive spectroscopy and glow discharge optical spectroscopy. Knoop hardness measurements, scratch tests, pin-on-disk tests and wear tests by ball cratering were determined to describe the mech. properties. Plasma duplex treatment combines the advantages of both sep. process steps. Case hardening during diffusion treatment offers a mech. support to the coating, which exhibits a lower coefficient of friction than the diffusion-treated surface. The optimal combination consists of PNC, at high plasma energy, and a B rich TiBN coating.
ST Stellite plasma duplex treatment adhesion; nitriding boride coating Stellite adhesion; nitrocarburizing boride coating Stellite adhesion
IT Adhesion, physical
(of plasma duplex treated Stellite)
IT Carbonitriding
Nitriding
(plasma duplex treatment of Stellite)
IT 12671-96-4, Stellite 6B
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(plasma duplex treatment of)
IT 12045-63-5P, Titanium boride (TiB2) 91914-87-3P, Titanium boride nitride (TiBN)
RL: PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation)
(plasma duplex treatment of Stellite)

RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD

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(2) Anon; Metallographie 1969
(3) Batelle Memorial Institute Centre d'Information Du Cobalt; Cobalt Monograph 1960
(4) Bethge, R; Proc Tribologie -Fachtagung Reibung, Schmierung, Verschleiss 1999

(5) Cooper, D; J Phys D Appl Phys 1992, V25, PA195 CAPLUS
(6) Dietz, T; Mat-wiss U Werkstofftech 1993, V24, P86 CAPLUS
(7) Kim, Y; Surf Coat Technol 1995, V74-75, P425 CAPLUS
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(13) Stauffer, W; Metal Progress 1956, V69(1), P102
(14) Uhlig, H; The Corrosion Handbook 1948

REFERENCE 7

AN 135:8703 CA
TI Modeling solid-particle erosion in high-temperature superalloys
AU Rohatgi, A.; Strutt, A. J.; Vecchio, K. S.
CS Department of Mechanical and Aerospace Engineering, University of California, San Diego, CA, 92093-0411, USA
SO Fundamental Issues and Applications of Shock-Wave and High-Strain-Rate Phenomena, Proceedings of the International Conference on Fundamental Issues and Applications of Shock-Wave and High-Strain-Rate Phenomena, (EXPLOMET '2000), Albuquerque, NM, United States, June 19-23, 2000 (2001), Meeting Date 2000, 539-546. Editor(s): Staudhammer, Karl P.; Murr, Lawrence E.; Meyers, Marc A. Publisher: Elsevier Science Ltd., Oxford, UK. CODEN: 69BFIV
DT Conference
LA English
CC 56-12 (Nonferrous Metals and Alloys)
AB The phenomenon of solid-particle erosion of materials is equivalent to high-speed impact with the impacted surface being deformed at strain rates .apprx.103 to 106/s. However, researchers have typically used the quasi-static strength of the materials to analyze or model their erosion behavior. While this approach may be appropriate for strain rate-insensitive materials, the mech. properties need to be determined at high strain rate when modeling the erosion behavior of strain rate-sensitive materials. The erosion behavior and mech. properties of several Ni, Co, and Fe wrought superalloys were analyzed. It was previously suggested that the erosion rate of a material is proportional to the ratio of the energy expended in plastic deformation (of the eroded surface) and its fracture energy. Since tensile toughness of a material represents the energy required for its fracture, high strain-rate (.apprx.103/s) tensile toughness of the test materials was determined at various elevated temps. The coefficient of restitution of several materials was determined as a function
of the
particle size, impact kinetic energy and target test temperature The measured values of tensile toughness and the coefficient of restitution are compared to the values used in a recent erosion model.
ST solid particle erosion nickel superalloy modeling; copper superalloy solid particle erosion modeling; iron superalloy solid particle erosion modeling
IT Erosion (wear)
Plastic deformation
(modeling solid-particle erosion in high-temperature superalloys)
IT Simulation and Modeling, physicochemical
(solid-particle erosion in high-temperature superalloys)
IT Toughness
(tensile; modeling solid-particle erosion in high-temperature superalloys)
IT 11134-23-9, AISI 316L 12671-96-4, Haynes 6B 12682-01-8, Inconel 625 94076-32-1, Haynes 230 98686-65-8, Hastelloy C22 157451-42-8, Alloy B3
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(modeling solid-particle erosion in high-temperature)
RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD
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(2) Donachie, M; Superalloys Source Book 1984, P3

(3) Finnie, I; J Mater 1967, V12, P682
(4) Gladys, N; Surface and Coatings Technology 1999, V120-121, P145 CAPLUS
(5) Hawke, R; IEEE Transactions on Magnetics 1995, V31, P725
(6) Hutchings, I; Wear 1981, V70, P269 CAPLUS
(7) Johnson, K; Contact Mechanics 1985, P363
(8) Lankov, A; Trenie i Iznos (Russian) 1992, V25, P206
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(10) Levy, A; Solid Particle Erosion and Erosion-Corrosion of Materials 1995, P69
(11) Shanov, V; Surface and Coatings Technology 1997, V94-95, P64 CAPLUS
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(13) Sundararajan, G; Wear 1983, V84, P237

REFERENCE 8

AN 134:211145 CA
TI A study on the characteristics of TiN film deposited using reactive magnetron sputter ion plating
AU Lee, M. K.; Kim, W. W.; Kim, S. J.; Lee, C. K.; Kim, Y. S.
CS Korea Atomic Energy Research Institute, Taejon, 305-353, S. Korea
SO Han'guk Pyomyon Konghak Hoechi (2000), 33(2), 115-125
CODEN: HPKHEL; ISSN: 1225-8024
PB Korean Institute of Surface Engineering
DT Journal
LA Korean
CC 56-6 (Nonferrous Metals and Alloys)
Section cross-reference(s): 57
AB TiN films were deposited onto Stellite 6B alloy (Co base) by the reactive magnetron sputter ion plating. As the bias increases, TiN film changes from columnar structure to dense structure with great hardness and smooth surface due to densification and resputtering by ion bombardment. The content of oxygen and carbon impurities in the TiN film decreases greatly when the substrate bias is applied. The preferred orientation of the TiN films changes from (200) to (111) with decreasing N2/Ar ratio, and from (200) to (111) and then (220) with increasing substrate bias. The change of the preferred orientation is discussed in terms of surface energy and strain energy which are related to the impurity contents and the ion bombardment damage. The hardness of the TiN film increases with increasing compressive stress generated in the film by virtue of ion bombardment. It becomes as high as up to 3500 kgf/mm2 when an appropriate substrate bias is applied.
ST titanium nitride reactive sputter deposition cobalt alloy hardness
IT Reactive sputtering
(deposition; preferred orientation and hardness of TiN film deposited using reactive magnetron sputter ion plating on cobalt alloy)
IT Crystal orientation
Hardness (mechanical)
(preferred orientation and hardness of TiN film deposited using reactive magnetron sputter ion plating on cobalt alloy)
IT Stress, mechanical
(residual, compressive, hardness from; preferred orientation and hardness of TiN film deposited using reactive magnetron sputter ion plating on cobalt alloy)
IT 12671-96-4, Stellite 6B 25583-20-4, Titanium nitride tin
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(preferred orientation and hardness of TiN film deposited using reactive magnetron sputter ion plating on cobalt alloy)

REFERENCE 9

AN 134:58374 CA
TI Expansion valve and refrigerating system

IN   Watanabe, Kazuhiko; Yano, Masamichi
PA   Fujikoki Mfg. Co., Ltd., Japan
SO   U.S., 14 pp.
      CODEN: USXXAM
DT   Patent
LA   English
IC   ICM F16K031-00
      ICS G05D027-00
NCL   251363000
CC   47-4 (Apparatus and Plant Equipment)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6164624	A	20001226	US 1995-554718	19951107
	US 6397628	B1	20020604	US 2000-543706	20000405
	US 2002008150	A1	20020124	US 2001-964447	20010928

PRAI JP 1995-82177   19950407
     JP 1995-170625   19950706
     US 1995-554718   19951107
     US 2000-543706   20000405

AB   An expansion valve comprises an orifice formed in a valve body and a valve member fixed to a movable member. Movement of a diaphragm is transmitted to an actuating rod via a member and the actuating rod actuated the movable member to control the opening amount of the path between the valve member and the orifice. An orifice member affixed to the orifice is made of a material harder than the valve body, and free from erosion or other damage by a refrigerant, which will otherwise occur at the valve opening portion.
ST   refrigerating system expansion valve
IT   Refrigerants
      Refrigerating apparatus
      Valves
         (expansion valve and refrigerating system)
IT   Hydrocarbons, uses
      RL: TEM (Technical or engineered material use); USES (Uses)
         (halo; expansion valve and refrigerating system)
IT   11114-34-4   12597-68-1, Stainless steel, uses   12597-71-6, Brass, uses
      12671-96-4   37323-75-4
      RL: DEV (Device component use); USES (Uses)
         (expansion valve and refrigerating system)
RE.CNT 22   THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Allen; US 2514532 1950
(2) Anon; GB 2096279 1982
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(4) Anon; Engineered Materials Handbook 1995
(5) Boltz; Handbook of Tables for Applied Engineering Science, 2nd Ed 1973
(6) Campbell; US 2478040 1949
(7) Chorkey; US 4834337 1989
(8) Dube; US 2250362 1941
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(10) Heymann, F; American Society for Testing and Materials 1970, P212
(11) Hilger; US 2141715 1938
(12) Kitamura; US 5301520 1994
(13) McGraw, H; Materials Handbook 12th Ed 1979, P930
(14) Oberhuber; US 1679779 1928
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(16) Platon; US 2471448 1949
(17) Robinson; US 3767164 1973
(18) Robinson; US 3863889 1975
(19) Shrode; US 1512243 1924
(20) Shrode; US 1578179 1926
(21) Thiel; US 4762733 1988
(22) Vadasz; US 4513778 1985

REFERENCE 10

AN 133:287916 CA
TI Corrosion/erosion resistance of Ultimet R31233 in a simulated feed for a radioactive vitrification facility
AU Imrich, Kenneth J.; Sides, Brian K.; Gee, James T.
CS Westinghouse Savannah River Company, Aiken, SC, 29808, USA
SO Ceramic Transactions (2000), 107(Environmental Issues and Waste Management Technologies in the Ceramic and Nuclear Industries V), 381-387
CODEN: CETREW; ISSN: 1042-1122
PB American Ceramic Society
DT Journal
LA English
CC 71-11 (Nuclear Technology)
Section cross-reference(s): 55, 57
AB Corrosion, erosion, and corrosion/erosion tests were performed to evaluate the performance of nickel- and cobalt-based alloys in a simulated sludge/borosilicate frit slurry representative of the feed preparation system for a radioactive waste vitrification facility. Alloys tested included Type 304L stainless steel, Hastelloy C-276, Stellite 6B, and Ultimet. Testing indicated that Ultimet had improved wear resistance and similar corrosion resistance compared to Hastelloy C-276 in the simulated sludge/frit environment.
ST high level waste vitrification equipment alloy corrosion erosion resistance
IT Frits
(borosilicate; corrosion/erosion resistance of Ultimet R31233 and other alloys in a simulated feed for a high-level radioactive waste vitrification facility)
IT Vitrification
(corrosion/erosion resistance of Ultimet R31233 and other alloys in a simulated feed for a high-level radioactive waste vitrification facility)
IT High-level radioactive wastes
(sludges; corrosion/erosion resistance of Ultimet R31233 and other alloys in a simulated feed for a high-level radioactive waste vitrification facility)
IT 12604-59-0, Hastelloy C-276 12611-86-8 12671-96-4, Stellite 6B 139658-36-9, Ultimet
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(corrosion/erosion resistance of Ultimet R31233 and other alloys in a simulated feed for a high-level radioactive waste vitrification facility)
RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
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(2) Crook, P; Advanced Materials & Processes 1994
(3) Nava, J; corrosion Science 1993, V35(5-8) CAPLUS
(4) Woodford, D; Metall Trans 1972, V3 CAPLUS

L10 ANSWER 17 OF 17 REGISTRY
RN 11105-36-5 REGISTRY
ED Entered STN: 16 Nov 1984
CN Cobalt alloy, base, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Carbon alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN Chromium alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN Iron alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN Manganese alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)

CN Molybdenum alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN Nickel alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN Silicon alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN Tungsten alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
OTHER NAMES:
CN Alloy 12
CN ASME SFA5.21-ERCoCr-B
CN AWS A5.21-ERCoCr-B
CN CoCr30W8
CN ERCoCr-B
CN Haynes 12
CN Haynes Stellite 12
CN HST-12
CN KC 29 W
CN R30012
CN RCoCr-B
CN SAE J775-VF7
CN SAE VF7
CN Soudostel 12
CN Stellite 12
CN Stellite WR12
CN UNS R30012
CN VF7
CN Virium 12
CN X140CoCrW 56 30 8
DR 12631-62-8, 62412-99-1, 85132-16-7
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
LC STN Files: CA, CAPLUS, CIN, USPATFULL
DT.CA CAplus document type: Conference; Journal; Patent; Report
RL.P Roles from patents: PREP (Preparation); PROC (Process); PRP (Properties); USES (Uses)
RL.NP Roles from non-patents: PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses); NORL (No role in record)

Component	Component Percent	Component Registry Number
Co	50 - 65	7440-48-4
Cr	26 - 32	7440-47-3
W	7 - 9.5	7440-33-7
Fe	0 - 3	7439-89-6
Ni	0 - 3	7440-02-0
Si	0.4 - 2	7440-21-3
C	1.2 - 1.7	7440-44-0
Mn	0 - 1	7439-96-5
Mo	0 - 1	7439-98-7

112 REFERENCES IN FILE CA (1907 TO DATE)
112 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 141:193639 CA
TI Development of 3D functionally graded models by laser-assisted coaxial powder injection
AU Yakovlev, Artem; Bertrand, Ph.; Smurov, Igor Y.
CS Ecole Nationale d'Ingenieurs de Saint-Etienne, Saint Etienne, 42023, Fr.
SO Proceedings of SPIE-The International Society for Optical Engineering

(2004), 5399(Laser-Assisted Micro- and Nanotechnologies 2003), 220-227
CODEN: PSISDG; ISSN: 0277-786X

PB SPIE-The International Society for Optical Engineering

DT Journal

LA English

CC 56-4 (Nonferrous Metals and Alloys)

AB Relatively new method of producing 3D objects with Functionally Graded Material (FGM) structure is realized by coaxial powder injection with variable composition into the zone of laser beam action. The desired 3D material distribution is realized by repetitive deposition process. Theor. anal. and exptl. results show essential role of radiation mode and powder granularity as optimization parameters. Applied laser sources are continuous wave Nd:YAG(HAAS 2006D, 2kW), pulse-periodic Nd:YAG(HAAS HL304P, avg. power 300 W), quasi-cw CO2 (Rofin-Sinar, 300 W). Among applied materials are nanostructured WC/Co, CuSn, Stainless steel 316L, 430L, Co-base alloy, nanostructured FeCu, etc. The originality of obtained results is that different gradient types are produced "in situ" and combined within one sample: smooth, sharp or multilayered gradients. The number of samples is produced and examined with metallog. and SEM anal. The minimal spatial gradient resolution (transition zone between 2 different materials) is starting from 10 μ and can be varied in a wide range; the surface roughness depends from powder granularity, best value of Ra is about 5 μm, microhardness of differet zones of samples is varied from 120 to 450 HV. The achieved geometry spatial resolution is 200 μm.

ST steel cobalt copper alloy laser prototyping powder injection

IT Lasers
Microhardness
Microstructure
(development of 3D functionally graded models by laser-assisted coaxial powder injection)

IT Composites
(functionally gradient; development of 3D functionally graded models by laser-assisted coaxial powder injection)

IT Models (physical)
(prototypes; development of 3D functionally graded models by laser-assisted coaxial powder injection)

IT 12611-86-8 56589-45-8, Iron alloy, Fe 65-71,Cr 17.0-19.0,Ni 8.00-10.00,Si 2.00-3.00,Mn 0.80-1.50,W 0.80-1.20,C 0.40-0.50,P 0-0.045,S 0-0.045 (DIN 1.4873)
RL: NUU (Other use, unclassified); USES (Uses)
(development of 3D functionally graded models by laser-assisted coaxial powder injection)

IT 11105-36-5, Stellite 12 11134-23-9 51636-79-4 58817-50-8 117629-22-8, Iron alloy, Fe 80-84,Cr 16.0-18.0,Mn 0-1.0,Si 0-1.0,P 0-0.04,C 0-0.03,S 0-0.03 (JIS SUS 430L) 141559-15-1, Cobalt alloy, Co 88, WC 12
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(development of 3D functionally graded models by laser-assisted coaxial powder injection)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Chen, I; Materials Science and Engineering 2001, VA317, P226 CAPLUS
(2) Ensz, M; Critical Issues For Functionally Graded Material Deposition By Laser Engineered Net Shaping (LENS)
(3) Iakovlev, A; IQEC proceedings 2002
(4) Jehnming, L; Journal of Materials Processing Technology 2000, V105, P17
(5) Jehnming, L; Optics & Laser Technology 1999, V31, P251
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(10) Wu, X; Surface and Coatings Technology 1999, V115, P111 CAPLUS

REFERENCE 2

AN 141:160593 CA
TI Activated combustion HVAF coatings for protection against wear and high temperature corrosion
AU Verstak, A.; Baranovski, V.
CS UniqueCoat Technologies, Ashland, VA, USA
SO Thermal Spray 2003: Advancing the Scienceand Applying the Technology, Proceedings of the International Thermal Spray Conference, Orlando, FL, United States, May 508, 2003 (2003), Volume 1, 535-541. Editor(s): Marple, Basil R.; Moreau, Christian. Publisher: ASM International, Materials Park, Ohio.
CODEN: 69EUUZ; ISBN: 0-87170-785-3
DT Conference
LA English
CC 56-6 (Nonferrous Metals and Alloys)
AB Activated-combustion high-velocity air-fuel (HVAF) spraying involves a jet of air-fuel combustion products to deposit coatings of metal and carbide powders. In the process, spray particles are heated to below their melting temperature while accelerated to a velocity typically 700-850 m/s to form a coating on impact with a substrate. A low oxygen content and high d. are distinguishing features of the coatings and result in their excellent performance under conditions of severe wear and corrosion. Besides a new level of coating quality, the coating process demonstrates outstanding efficiency and spray rates 5-10 times exceeding those of the high-velocity oxy-fuel counterparts. Results on the characterization of selected metal and carbide coatings are presented, and their applications are described.
ST wear resistant anticorrosive spray coating
IT Coating materials
(abrasion-resistant; activated combustion high-velocity air-fuel coatings for protection against wear and high temperature corrosion)
IT Coating materials
(anticorrosive; activated combustion high-velocity air-fuel coatings for protection against wear and high temperature corrosion)
IT Coating process
(spray; activated combustion high-velocity air-fuel coatings for protection against wear and high temperature corrosion)
IT 11105-36-5, Stellite 12 12682-01-8, Alloy 625 56273-47-3, Alloy 671 62531-60-6 112417-62-6
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(activated combustion high-velocity air-fuel coatings for protection against wear and high temperature corrosion)
RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

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(2) Dorfman, M; Advanced Materials & Processes 2002, V160(7), P47
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(8) Stoltenhoff, T; Proceeding of the International Thermal Spray Conference 2002, P366
(9) Verstak, A; Corrosion'99 1999, Paper No 74

REFERENCE 3

AN 141:92528 CA
TI Temperature monitoring of Nd:YAG laser cladding (CW and PP) by advanced pyrometry and CCD-camera-based diagnostic tool

AU Doubenskaia, M.; Bertrand, Ph.; Smurov, Igor Y.
CS Lab. DIPI, Ecole Nationale d'Ingenieurs de Saint-Etienne, Saint-Etienne, 42023, Fr.
SO Proceedings of SPIE-The International Society for Optical Engineering (2004), 5399(Laser-Assisted Micro- and Nanotechnologies 2003), 212-219
CODEN: PSISDG; ISSN: 0277-786X
PB SPIE-The International Society for Optical Engineering
DT Journal
LA English
CC 56-6 (Nonferrous Metals and Alloys)
AB The set of original pyrometers and the special diagnostic CCD-camera were applied for monitoring of Nd:YAG laser cladding (Pulsed-Periodic and Continuous Wave) with coaxial powder injection and online measurement of cladded layer temperature The expts. were carried out in course of elaboration of wear resistant coatings using various powder blends (WC-Co, CuSn, Mo, Stellite grade 12, etc.) applying variation of different process parameters: laser power, cladding velocity, powder feeding rate, etc. Surface temperature distribution to the cladding seam and the overall temperature mapping were registered. The CCD-camera based diagnostic tool was applied for: (i) monitoring of flux of hot particles and its instability; (ii) measurement of particle-in-flight size and velocity; (iii) monitoring of particle collision with the clad in the interaction zone.
ST laser cladding surface temp pyrometry CCD camera
IT Coating materials
(abrasion-resistant; temperature monitoring in Nd:YAG laser cladding by advanced pyrometry and CCD-camera-based diagnostic tool)
IT Velocity
(of particles; temperature monitoring in Nd:YAG laser cladding by advanced pyrometry and CCD-camera-based diagnostic tool)
IT Laser cladding
Surface temperature
(temperature monitoring in Nd:YAG laser cladding (CW and PP) by advanced pyrometry and CCD-camera-based diagnostic tool)
IT CCD cameras
Particle size distribution
Pyrometry
(temperature monitoring in Nd:YAG laser cladding by advanced pyrometry and CCD-camera-based diagnostic tool)
IT 12005-21-9, YAG
RL: DEV (Device component use); USES (Uses)
(laser, neodymium-doped; temperature monitoring in Nd:YAG laser cladding by advanced pyrometry and CCD-camera-based diagnostic tool)
IT 7439-98-7, Molybdenum, processes 11105-36-5, Stellite 12 12003-21-3
12597-70-5, Bronze 12637-51-3
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(temperature monitoring in Nd:YAG laser cladding by advanced pyrometry and CCD-camera-based diagnostic tool)
RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD
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(2) Bertrand, P; Proceedings of the ITSC2002 2002
(3) Coates, P; Metrologia 1981, V17, P103
(4) Daniel, N; NASA Technical Memorandum 1997, P107433
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(6) Duvaut, T; These Universite de REIMS CHAMPAGNE-ARDENNES 1994
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(11) Ignatiev, M; Journal of Measurement Science and Technology 1994, V5, P563 CAPLUS

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(14) Quinn, T; Temperature 1983
(15) Smurov, I; CISFFEL-6 1998, P647
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(18) Ya, S; High Temperatures-High Pressures 1972, V4, P715
(19) Ya, S; High Temperatures-High Pressures 1976, V8, P493

REFERENCE 4

AN 140:378762 CA
TI Laser cladding of wear resistant metal matrix composite coatings
AU Yakovlev, A.; Bertrand, Ph.; Smurov, I.
CS DIPI, ENISE, Saint Etienne, 42023, Fr.
SO Thin Solid Films (2004), 453-454, 133-138
CODEN: THSFAP; ISSN: 0040-6090
PB Elsevier B.V.
DT Journal
LA English
CC 56-6 (Nonferrous Metals and Alloys)
AB A number of coatings with wear-resistant properties as well as with a low friction coefficient are produced by laser cladding. The structure of these coatings is determined by required performance and realized as metal matrix composite (MMC), where solid lubricant serves as a ductile matrix (e.g. CuSn), reinforced by appropriate ceramic phase (e.g. WC/Co). One of the engineered coatings with functionally graded material (FGM) structure has a dry friction coefficient 0.12. Coatings were produced by coaxial injection of powder blend into the zone of laser beam action. Metallog. and tribol. examns. were carried out confirming the advanced performance of engineered coatings.
ST metal matrix composite wear resistant coating laser cladding
IT Coating materials
(abrasion-resistant, metal matrix composite; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT Friction
Laser cladding
(laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT Metal matrix composites
(wear-resistant coatings; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT 117629-22-8, Aisi430l
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(composites with tungsten carbide reinforcement and CuSn solid lubricant, wear-resistant coatings; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT 11105-36-5, Stellite 12
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(core, wear-resistant coating component; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT 12667-47-9
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(reinforcement phase, composites with CuSn solid lubricant, wear-resistant coatings; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT 112417-62-6

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(reinforcement phase, composites with steel matrix and CuSn solid lubricant, wear-resistant coatings; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)

IT 12675-87-5 51636-79-4
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(solid lubricant, wear-resistant coating component; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

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(3) Man, H; Scripta Mater 2001, V44, P2801 CAPLUS
(4) Pei, Y; Acta Mater 2000, V48, P2617 CAPLUS
(5) Przybyowicz, J; J Mater Process Technol 2001, V109, P154
(6) Wu, X; Surf Coat Technol 1999, V115, P111 CAPLUS

REFERENCE 5

AN 140:132283 CA
TI Activated combustion HVAF: new development in solid particle spray technology
AU Verstak, A.; Baranovski, V.
CS UniqueCoat Technologies, Ashland, VA, USA
SO Surface Engineering: Coatings and Heat Treatments, Proceedings of the 1st ASM International Surface Engineering Congress and the 13th International Federation for Heat Treatment and Surface Engineering Congress, Columbus, OH, United States, Oct. 7-10, 2002 (2003), Meeting Date 2002, 685-689. Editor(s): Popoola, Oludele O. Publisher: ASM International, Materials Park, Ohio.
CODEN: 69DYAM; ISBN: 0-87170-781-0
DT Conference
LA English
CC 57-9 (Ceramics)
Section cross-reference(s): 55, 56
AB Activated Combustion HVAF Spraying (AC-HVAF) utilizes a jet of air and gaseous fuel combustion products to deposit coatings of metallic and carbide powders. In the jet, spray particles are heated below their melting temperature while accelerated to velocity well above 700 m/s, forming a coating upon impact with a substrate. Low oxygen content and high d. are basic advantages of the AC-HVAF coating structure. The AC-HVAF process demonstrates outstanding technol. efficiency and spray rates many folds exceeding those of the HVOF counterparts.
ST activated combustion HVAF spraying cermet alloy microstructure
IT Cermets
Combustion
Microstructure
Particle size
Spraying
(activated combustion HVAF solid particle spray technol.)
IT 7440-22-4, Silver, processes 7440-50-8, Copper, processes 11105-36-5, Stellite 12 12682-01-8, Alloy 625 56273-47-3, Alloy 671 82839-77-8
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(activated combustion HVAF solid particle spray technol.)
IT 12070-12-1, Tungsten carbide 54988-78-2 112417-62-6
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(cermet; activated combustion HVAF solid particle spray technol.)
IT 74-98-6, Propane, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(fuel; activated combustion HVAF solid particle spray technol.)
IT 7429-90-5, Aluminum, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(substrate; activated combustion HVAF solid particle spray technol.)

REFERENCE 6

AN 140:62665 CA
TI Application of finite element method to plasma weld surfacing of highly stressed components
AU Matthes, K.-J.; Alaluss, K.; Semmler, U.; Haase, J.; Gebert, A.
CS Chemnitz, Germany
SO DVS-Berichte (2003), 225, 273-278
CODEN: DVSBA3; ISSN: 0418-9639
PB Verlag fuer Schweissen und Verwandte Verfahren DVS-Verlag
DT Journal
LA German
CC 55-6 (Ferrous Metals and Alloys)
AB Weld surfacing of steel (S235JR and S355JO) with wear resistant Co-base alloy Stellit 6 and 12, Ni-base alloy Ni625, and V-base alloy V12 is studied. Due to significant differences in thermo-phys. and mech. properties between base and filler materials, FEM modeling is performed for computation the weld pool geometry, residual stress distribution, and distortions of a rolling mill roller segment. Calcn. and exptl. results well agreed.
ST plasma weld surfacing steel finite element simulation
IT Weld surfacing
(finite-element simulation of plasma weld surfacing of highly stressed steel components with Co, Ni, and V alloys)
IT Simulation and Modeling, physicochemical
(finite-element; of plasma weld surfacing of highly stressed steel components with Co, Ni, and V alloys)
IT Welding of metals
(plasma-arc; finite-element simulation of plasma weld surfacing of highly stressed steel components with Co, Ni, and V alloys)
IT 11105-35-4, Stellite 6 11105-36-5, Stellite 12 12682-01-8, Ni625 58503-89-2, S235JR, processes 71497-79-5, S355JO, processes 639475-36-8, V12 (Alloy)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(finite-element simulation of plasma weld surfacing of highly stressed steel components with Co, Ni, and V alloys)
RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
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(5) Lugscheider, E; Untersuchungen von WIG- und plasma-pulver-auftraggeschweiter Hartlegierungen fur Ventilsitzbeschichtungen 1989
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(8) Touloukian, Y; Thermophysical Properties of Matter 1979, V14

REFERENCE 7

AN 139:368147 CA
TI Braze, braze-containing material, and process for repair of defect in metal article surface
IN Nakahashi, Masako; Yasuda, Yuji; Asai, Satoshi; Tokunaga, Takashi; Nishimoto, Kazutoshi; Saita, Kazuyuki
PA Toshiba Corp., Japan; Toshiba Engineering Co.
SO Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM B23K035-30
ICS B23P006-00; C22C019-03
CC 56-3 (Nonferrous Metals and Alloys)
Section cross-reference(s): 57
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003326387	A2	20031118	JP 2002-138762	20020514

PRAI JP 2002-138762 20020514
AB The braze comprises a main metal which has m.p. lower than the article metal, a minor metal (a) which alloys the main metal and decreases the m.p., and a minor metal (b) which alloys the main metal or minor metal (a) and produces a precipitate with hardness higher than the main metal. The braze shows high hardness, wear resistance, and defect filling efficiency. To improve hardness and overlay thickness a hard material is added to the braze. The repair process includes applying the braze (or braze-containing material) to the defect and filling the defect with the braze by heating in inert gas atmospheric or vacuum. Optionally a wear-resistant piece is joined to the metal surface by the braze to cover the defect.
ST braze compn metal surface defect repair
IT Brazes
(brazes for repair of metal surface defects with improved hardness and overlay thickness and filling efficiency)
IT Borides
Carbides
Nitrides
RL: TEM (Technical or engineered material use); USES (Uses)
(hard material, added to brazes; brazes for repair of metal surface defects with improved hardness and overlay thickness and filling efficiency)
IT Cobalt alloy, base
Nickel alloy, base
RL: TEM (Technical or engineered material use); USES (Uses)
(hard material, added to brazes; brazes for repair of metal surface defects with improved hardness and overlay thickness and filling efficiency)
IT 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7439-93-2, Lithium, uses 7440-21-3, Silicon, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(braze component; brazes for repair of metal surface defects with improved hardness and overlay thickness and filling efficiency)
IT 11122-45-5 622331-41-3 622331-42-4 622331-43-5
RL: TEM (Technical or engineered material use); USES (Uses)
(brazes; brazes for repair of metal surface defects with improved hardness and overlay thickness and filling efficiency)
IT 10043-11-5, Boron nitride (BN), uses 11105-36-5, Stellite 12 12629-02-6, Stellite 21 12667-49-1 37270-35-2, Stellite 1 51613-82-2 622331-44-6
RL: TEM (Technical or engineered material use); USES (Uses)
(hard material, added to brazes; brazes for repair of metal surface defects with improved hardness and overlay thickness and filling

efficiency)

REFERENCE 8

AN 139:340204 CA
TI Use of the finite-element method in manufacture of hot forming tools by near-net shaping weld surfacing
AU Matthes, Klaus-Juergen; Alaluss, Khaled
CS Chemnitz, Germany
SO Schweissen & Schneiden (2003), 55(8), 436-438,440,442-444
CODEN: SCSCA4; ISSN: 0036-7184
PB Verlag fuer Schweissen und Verwandte Verfahren DVS-Verlag
DT Journal
LA German
CC 55-6 (Ferrous Metals and Alloys)
AB A calcn. model for near-net-shape weld surfacing of a cross rolling segment is introduced. At the end, the weld pool geometry, its deformations, and its residual stresses can be calculated Weld seam defects, lacks of fusion, and base metal accumulation can be analyzed and prevented by heat flux d. adjustment. Well accordance between calcns. and expts. could be shown by two examples.
ST hot forming tool weld surfacing finite element simulation; steel forming tool abrasion resistant coating weld surfacing simulation
IT Coating materials
(abrasion-resistant; finite-element simulation in manufacture of hot forming tools by near-net shaping weld surfacing)
IT Weld surfacing
(finite-element simulation in manufacture of hot forming tools by near-net shaping weld surfacing)
IT Simulation and Modeling, physicochemical
(finite-element; finite-element simulation in manufacture of hot forming tools by near-net shaping weld surfacing)
IT Tools
(forming; finite-element simulation in manufacture of hot forming tools by near-net shaping weld surfacing)
IT Stress, mechanical
(residual; finite-element simulation in manufacture of hot forming tools by near-net shaping weld surfacing)
IT 11105-36-5, Stellite 12
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(coating; finite-element simulation in manufacture of hot forming tools by near-net shaping weld surfacing)
IT 12682-01-8, Ni 625
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(intermediate layer; finite-element simulation in manufacture of hot forming tools by near-net shaping weld surfacing)
IT 58503-89-2, S235JR, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(tool; finite-element simulation in manufacture of hot forming tools by near-net shaping weld surfacing)
RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

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(5) Richter, F; Stahleisen-Sonderberichte 1983, 10, CAPLUS
(6) Touloukian, Y; Thermophysical properties of matter 1979

REFERENCE 9

AN 136:266491 CA
TI Evaluation of the characteristics and wear resistance of layers produced in a ion-nitrided Stellite alloy
AU Riofano, Rosamel M. Munoz; Casteletti, Luiz Carlos; Amoni, Eduardo Augusto B.; Nucci, Rafael
CS Escola de Engenharia de Sao Carlos, Universidade de Sao Paulo, Brazil
SO EBRATS 2000, Encontro e Exposicao Brasileira de Tratamentos de Superficie, 10th, Sao Paulo, Brazil, May 22-25, 2000 (2000), 340-347 Publisher: Associacao Brasileira de Tratamentos de Superficie, Sao Paulo, Brazil. CODEN: 69CGI5
DT Conference; (computer optical disk)
LA Portuguese
CC 56-7 (Nonferrous Metals and Alloys)
AB In the present work, the Stellite 12 alloy with the chemical composition 0.87C-0.94Mn-1.22Si-1,78Ni-31.63Cr-9.74W-3.51Fe-48.72Co was ion-nitrided and the temps., time of treatment, and frequencies of the pulse were varied to obtain the most appropriate layer. The layers were characterized by metallog. and microhardness tests, resistance to wear, and EDX probe . The treatment was effective to increase the resistance to abrasive wear. The layer was formed on the substrate, being absent of surface carbides. The ion nitrided layer consisted of chromium nitrides of the type CrN and Cr2N. The EDX anal. indicated the possibility of the carbonitrides presence in the surface.
ST cobalt alloy ion nitriding wear resistance
IT Coating materials
  (abrasion-resistant; evaluation of characteristics and wear resistance of layers produced on ion-nitrided Stellite alloy)
IT Nitriding
  (plasma; evaluation of characteristics and wear resistance of layers produced on ion-nitrided Stellite alloy)
IT 11105-36-5, Stellite 12
  RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
  (evaluation of characteristics and wear resistance of layers produced on ion-nitrided Stellite alloy)
IT 12053-27-9P, Chromium nitride Cr2N
  RL: SPN (Synthetic preparation); PREP (Preparation)
  (evaluation of characteristics and wear resistance of layers produced on ion-nitrided Stellite alloy)
IT 24094-93-7P, Chromium nitride CrN
  RL: SPN (Synthetic preparation); PREP (Preparation)
  (surface layer containing; evaluation of characteristics and wear resistance of layers produced on ion-nitrided Stellite alloy)
RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
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(2) Kim, S; Surface and Coatings Technology 1995, V74-75, P425
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REFERENCE 10

AN 136:203504 CA
TI Thermal fatigue characteristics of PTA hardfaced steels
AU Kang, S. H.; Shinoda, T.; Kato, Y.; Jeong, H. S.
CS Nagoya University, Nagoya, 464-8603, Japan
SO Surface Engineering (2001), 17(6), 498-504
CODEN: SUENET; ISSN: 0267-0844
PB IOM Communications Ltd.
DT Journal
LA English
CC 55-12 (Ferrous Metals and Alloys)
AB Many types of hard material are coated on the surface to improve their

wear resistance. Addition of vanadium carbide to Co based alloys (stellite number 21) as a hard material powder is one of the ways to improve the wear resistance characteristics of the surface layer. The plasma transfer arc (PTA) welding process was introduced as a coating technol. for elevated temperature surface modification. This process has recently generated interest in the surface modification field owing to its operability, low initial cost of equipment, high deposition rate, and small dilution rate. Coated layers produced by PTA considerably improve the hardness and wear resistance of surface layers for elevated temperature applications. Vanadium carbide (VC) addition into stellite powder showed a significant improvement in wear resistance. However, alloys containing VC showed pronounced sensitivity to hot cracking under repeated heating and cooling environments. This study clarifies the cause of thermal fatigue cracking in Co based alloy deposits with VC powder addns. Cracks result from the difference in thermal expansion coefficient between the matrix and the carbides. Cracks initiate in the central part of the surface region and grow in a perpendicular direction towards the surface. The tendency for thermal fatigue crack initiation seems to increase with increasing carbide volume fraction and decrease as the volume fraction of the dendritic region decreases.

ST thermal fatigue hardfaced steel welding hot crack wear

IT Microcrack
(hot; thermal fatigue characteristics of PTA hardfaced steels)

IT Welding
(plasma transfer arc; thermal fatigue characteristics of PTA hardfaced steels)

IT Cooling
Crack initiation
Hardness (mechanical)
Thermal expansion
Thermal fatigue
Wear
(thermal fatigue characteristics of PTA hardfaced steels)

IT Carbides
RL: PNU (Preparation, unclassified); PREP (Preparation)
(thermal fatigue characteristics of PTA hardfaced steels)

IT 12741-56-9, SKD61
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(thermal fatigue characteristics of PTA hardfaced steels)

IT 12070-10-9, Vanadium carbide
RL: MOA (Modifier or additive use); USES (Uses)
(thermal fatigue characteristics of PTA hardfaced steels)

IT 11105-35-4, Stellite 6 11105-36-5, Stellite 12 12629-02-6, Stellite 21 125780-51-0, Stellite 32
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(thermal fatigue characteristics of PTA hardfaced steels)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

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(2) Chase, T; Report R1-R23
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(7) Sasaki, K; Overlaying by plasma transferred arc welding Report IIW-Doc IX-1669-92, P23
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